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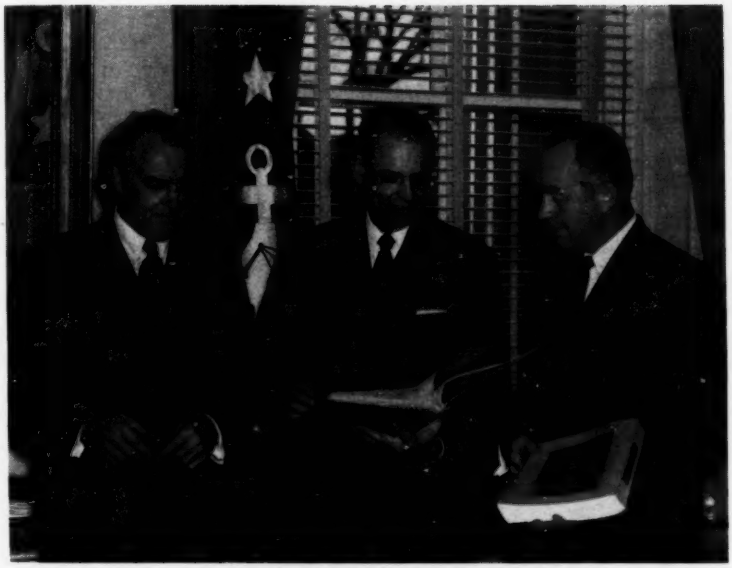

Tenth Annual Progress Report of the Joint Improvement Program was issued by Comptroller General Joseph Campbell *(left)*, Secretary of the Treasury Robert B. Anderson *(center)*, and Budget Bureau Director Maurice H. Stans *(right)*.

Joint Improvement Program, Government-wide, and Civil Agencies Steering Committee members were J. M. Sullivan, General Accounting Office *(left)*, G. F. Stickney, Treasury *(center)*, and W. J. Armstrong, Budget Bureau *(right)*. S. B. Savage, Jr., General Accounting Office, a fourth committee member, was unable to be present when the picture was taken.

Tenth Annual Progress Report

The Tenth Annual Progress Report under the Joint Program to Improve Accounting in the Federal Government, 1958, was signed and released on January 9, 1959, by the Secretary of the Treasury, the Director of the Bureau of the Budget, and the Comptroller General of the United States.

In addition to the regular annual review of operations under the Joint Program for the fiscal year 1958, this progress report contains a summary of the progress made during the ten years since the inception of the program. It also contains a summary of the current status of agency financial management programs, as developed by the agencies under the guidelines established by the Bureau of the Budget Bulletin No. 57–5 of October 1956. Copies of the report may be obtained from the issuing agencies.

The ten-year summary, "Ten Years of Progress," which comprises Part I of the report, is reprinted below.

Ten Years of Progress

THE Joint Program to Improve Accounting in the Federal Government grew out of joint discussions begun in December 1947 by the Comptroller General of the United States, the Secretary of the Treasury, and the Director of the Bureau of the Budget as to the needs and problems of the Government for more effective and economical financial management practices. On October 20, 1948, speaking for himself as well as the Secretary of the Treasury and the Director of the Bureau of the Budget, the Comptroller General officially announced the Joint Program in a letter to the heads of all Government departments and agencies. The letter described the objectives of the program as follows:

The program contemplates the full development of sound accounting within each agency, as a working arm of management, in terms of financial information and control. At the same time it envisions an integrated pattern of accounting and financial reporting for the Government as a whole responsive to executive and legislative needs. Balanced recognition will be given to the need for a flexible basis for accounting development within agencies in the light of varying types of operations and management problems and to overall fiscal, reporting, and audit responsibilities. The accounting and reporting principles, standards and basic procedures established will take into consideration the various areas of responsibility involved, the elimination of overlapping operations and paper work, and the fuller application of efficient methods and techniques in accounting operations throughout the Government.

Since accounting, in the broad sense of that term, furnishes the foundation for financial reporting, support for budget actions, and information required to assist in the planning and evaluation of management actions, the accounting practices of the Government were given priority attention when the program was started. It was from this that the Joint Program received its name although, as the program developed and matured, all financial management functions, and their interrelationship with each other, have been given equal attention. In a brochure issued in May 1958,[1] the objectives of the Program, as evolved over the last ten years, were described thus:

The basic goal of the Program is the improvement of financial management practices throughout the Government in a manner that will satisfy the management needs of the executive and legislative branches and the existing legal requirements. The current objectives include the following:

1. Strengthening of agency organization and staff facilities to provide for the most effective conduct of agency financial management.
2. Establishment of effective agency accounting systems on a accrual basis to the fullest extent this accounting basis is appropriate.
3. Establishment of monetary property accounting as an integral part of agency accounting systems.
4. Establishment of cost-based budgeting practices effectively integrated with the accounts to provide adequate support for budget requests.
5. Simplification of agency appropriation and allotment structures, and development of the most effective methods of control of appropriations, funds, obligations, expenditures, and costs.
6. The use of consistent classifications to bring about effective coordination of agency programming, budgeting, accounting, and reporting practices.
7. Establishment of suitable internal control practices, including internal audit, in the agencies.

[1] "The Joint Program for Improving Accounting in the Federal Government—Its Scope, Objectives, Concepts, and Methods" which was prepared by the Bureau of the Budget, Treasury Department, and the General Accounting Office.

8. Effective integration of agency accounting and reporting with the requirements of the budget process and the central accounting and reporting of the Treasury Department.
9. Development of accurate and useful agency and Government-wide reports on fiscal status, financial results of operations, and cost of agency performance of assigned functions.
10. Education of personnel in effective maintenance and maximum utilization of these management tools to effect economy in Government operations.

The attainment of these objectives required a new look at governmental financial management practices in the light of current techniques and knowledge, and the size and scope of 20th century government. It required analysis of existing laws and regulations under which the financial management practices were prescribed or otherwise molded. It required the adaptation of the best financial management practices of modern private enterprise to the activities of national government, to the fullest extent appropriate. It required the development of a united effort to devise needed improvements through joint and cooperative working arrangements between the administrative agencies and the three central agencies—the Treasury, the General Accounting Office, and the Bureau of the Budget.

Indicative of the public recognition of the Joint Program is the following quoted from an article published in the official publication of the American Institute of Certified Public Accountants:[1]

It is not the purpose of this article to arouse new indignation by pointing again to Washington's alleged shortcomings. Instead, it has the more cheering purpose of calling attention to the little known fact that a purposeful, productive campaign is afoot to modernize the entire structure of government accounting along lines that the tax-paying public, and the accounting profession particularly, might well applaud.

What is happening lacks the dramatic impact of a revolution. But it represents something better, a planned evolution which promises to work the most significant transformation in our government's financial management since the days of Alexander Hamilton.

Both the executive and legislative branches have important stakes in this long-term effort. And both branches are cooperating in a joint endeavor to effect this transformation and to reach these explicit goals:

1. To bring to all of the government's diversified activities the most appropriate and useful of modern accounting principles and techniques.
2. To enable government agencies to ascertain the cost of their various activities, as many of them have been unable to do in the past.

[1] "Accounting Reform in Washington" by John W. McEachren, CPA, in September 1955 issue of the *Journal of Accountancy*.

3. To provide better fiscal controls which will permit the executive to budget projected activities more realistically; assist the legislative in its appropriating functions; and allow the taxpayer to see more clearly how his money is spent and what it buys.
4. To reduce expenditures wherever possible by improving the efficiency and effectiveness of management.

Legislation

Financial management functions, like all operations of the Government, must be conducted in accordance with laws enacted by the Congress. Such laws govern the authority and responsibility of individuals and organizations, and provide basic requirements either in broad outline or in detail. When substantial changes are contemplated in the concepts or methods of Federal Government financial management practices, the requirements of existing law and the necessity for new legislation must be examined. Therefore, one of the first steps under the Joint Accounting Improvement Program was to determine what new legislation, or revisions of existing legislation, would be needed.

During the period 1949–1951 several important laws were enacted, notably the Budget and Accounting Procedures Act of 1950, approved September 12, 1950 (Public Law 784, 81st Congress). This was the first comprehensive law covering budgeting, accounting, auditing, and reporting since the Budget and Accounting Act, 1921. The new law (1) provided for including in the Budget information on the functions and activities of the Government and other desirable classifications of data, and strengthened the Bureau of the Budget in connection with its responsibilities for improvement of management throughout the executive branch, (2) defined the respective responsibilities of the General Accounting Office, the Treasury Department, and each executive agency in the accounting and reporting functions of the Government, and (3) restated the responsibility of the General Accounting Office for auditing the activities of Government agencies and authorized such audits to be made at the site of agency operations with due regard to generally accepted principles of auditing. The law contained the following declaration of the policy of the Congress:

Section 111. It is the policy of the Congress in enacting this part that—

(a) The accounting of the Government provide full disclosure of the results of financial operations, adequate financial information needed in the management of operations and the formulation and executive of the Budget, and effective control over income, expenditures, funds, property, and other assets.

(b) Full consideration be given to the needs and responsibilities of both the legislative and executive branches in the establishment of accounting and reporting systems and requirements.

(c) The maintenance of accounting systems and the producing of financial reports with respect to the operations of executive agencies, including central facilities for bringing together and disclosing information on the results of the financial operations of the Government as a whole, be the responsibility of the executive branch.

(d) The auditing for the Government, conducted by the Comptroller General of the United States as an agent of the Congress be directed at determining the extent to which accounting and related financial reporting fulfill the purposes specified, financial transactions have been consummated in accordance with laws, regulations or other legal requirements, and adequate internal financial control over operations is exercised, and afford an effective basis for the settlement of accounts of accountable officers.

(e) Emphasis be placed on effecting orderly improvements resulting in simplified and more effective accounting, financial reporting, budgeting, and auditing requirements and procedures and on the elimination of those which involve duplication or which do not serve a purpose commensurate with the costs involved.

(f) The Comptroller General of the United States, the Secretary of the Treasury, and the Director of the Bureau of the Budget conduct a continuous program for the improvement of accounting and financial reporting in the Government.

In order to clear the way for the modernization and streamlining of the financial management of the Government as provided in the Budget and Accounting Procedures Act of 1950 and as contemplated in the objectives of the Joint Accounting Improvement Program, it was necessary to remove outmoded or otherwise impeding laws from the statute books. This was done in Title III of the Budget and Accounting Procedures Act of 1950 which repealed 106 laws or parts of laws containing financial management requirements, many of which had been enacted prior to 1900. Also, Title II of the Act gave the Secretary of the Treasury and the Comptroller General, jointly, special authority to waive requirements of existing law regarding warrant procedures for the receipt, retention, and disbursement of public moneys and trust funds.

The list of all other legislation enacted between 1949 and 1951 which affected the future course of the Joint Accounting Improvement Program is extensive. Among these are (1) Title IV of the National Security Act Amendments of 1949 (Public Law 216, 81st Congress) for the promotion of economy and efficiency through establishment of uniform budgetary and fiscal procedures and organization in the

Department of Defense, (2) the Federal Property and Administrative Services Act of 1949 (Public Law 152, 81st Congress) to simplify the procurement, utilization, and disposal of Government property, to reorganize certain agencies of the Government, and for other purposes, (3) the Post Office Department Financial Control Act of 1950 (Public Law 712, 81st Congress) to provide improved procedures with respect to the financial control of the Post Office Department and for other purposes, and (4) Chapter XI of the General Appropriation Act, 1951, which amended Section 3679 of the Revised Statutes (the "Anti-Deficiency Act") to strengthen the control over obligations and expenditures incurred under appropriations.

Legislation relating to specific aspects of financial management was also enacted during the ensuing years, particularly to give effect to recommendations contained in the second Hoover Commission budget and accounting report issued in June 1955. This report contained 25 recommendations related to budgeting, financing, accounting, reporting, and auditing practices of the Government. Many of these recommendations could be accomplished administratively within the framework of existing statutes, but it was considered necessary to legislate in connection with certain of these recommendations and Public Law 863, 84th Congress, was passed and approved on August 1, 1956. This law provided that (1) agency accounts should be maintained on the accrual basis of accounting, (2) agencies should use cost-based budgets in support of appropriation requests and for internal agency administration and operation purposes, (3) there should be, insofar as possible, consistency in the accounting and budgeting classifications of each agency, synchronization between such classifications and the agency's organizational structure, and budget information on performance and program costs by organizational units, and (4) each agency should work toward simplification of its administrative control of funds (allotment) system. These recommendations were strongly supported by the three central agencies—the Bureau of the Budget, the General Accounting Office, and the Treasury Department.

Other recent legislation relating to financial management functions include (1) Public Law 798, approved July 25, 1956, which affects appropriation accounting and the processing of claims, (2) Public Law 85–183, approved August 28, 1957, to simplify accounting procedures relating to check transactions in the central accounts, and (3) Public Law 85–759, approved August 25, 1958, "to provide for improved methods of stating budget estimates and estimates for deficiency and sup-

plemental appropriations" by providing for the inclusion of proposed limitations on annual accrued expenditures in such estimates.

The Congress and the Joint Accounting Improvement Program

The job of modernizing and streamlining the financial management functions of the Government under the Joint Accounting Improvement Program could not have been accomplished without the support and cooperation of the Congress, its committees, and the staffs of those committees. The Appropriations Committees and the Government Operations Committees of both the Senate and the House have been particularly active in this regard. The three central agencies, in their over-all coordination of the Joint Program, have maintained close liaison with the staffs of these committees and have received invaluable assistance from these staffs in the resolution of problems encountered. Furthermore, the constant interest of members, committees, and staffs of the Congress in the progress of the Joint Program, as evidenced by their inquiries concerning broad or specific areas of activities, provides a great stimulus to the central agencies and to individual operating agencies to attain the objectives of the most effective and economical financial management practices.

How the Joint Program is Operated

The Federal Government is comprised of many departments and agencies, each having its own duties and responsibilities and administering diversified programs. The differences in functions and organization structure dictate that the financial management needs of the several managements will certainly be different at least in details and quite often somewhat different in the broader aspects of these functions.

In recognition of this, the Joint Accounting Improvement Program is operated as a joint and cooperative undertaking of all the organizations of the Government, with the Bureau of the Budget, the General Accounting Office, and the Treasury Department as the central or over-all coordinating group. The central agencies have, over the past ten years, issued principles, policies, and guidelines, consistent with laws enacted by the Congress, to provide the framework for the development of financial management practices that will more economically and effectively meet the needs of operating management. These principles, policies, and guidelines were evolved after thorough consideration by each of the central agencies of their own responsibilities and the needs of operating agency management. The objective is to make

the principles, policies, and guidelines sufficiently definitive to clearly state the most desirable practices but not so detailed as to restrict the financial management organizations, systems, and procedures of dissimilar operations into a rigid form in all respects.

The central agencies have also provided advice and assistance to the other agencies in developing needed financial management improvements within agencies, have kept abreast of the efforts being made by each agency in this respect, and, in general, have served as the clearing house for problems and stimulating action.

The central agencies perform these coordinating functions either separately (with the full knowledge of the other two central agencies) or jointly through committees or joint project teams. Such a committee or joint team may be composed of representatives of the central agencies or of representatives of the central agencies and an operating agency, depending upon the matter involved. Two joint committees have been established under the Joint Program, one for government-wide and civil agency financial management improvements and the other for financial management improvements in the Department of Defense. These are continuing committees. Joint project teams have been established during the past ten years to work on specific problems, and many of them have completed the tasks for which they were created.

The biggest and the basic area of financial management in the Federal Government is in the several departments and agencies, and in their bureaus, offices, and other organizational subdivisions. The success of the Joint Accounting Improvement Program depends substantially on the degree to which the financial management systems, procedures, and other practices of the individual operating agencies are modernized and streamlined on the most economical and efficient basis.

Some agencies were equipped with the manpower and the technical knowhow to install needed improvements with their own personnel. Others needed greater or less assistance from the central agencies. Still others employed firms of management engineers, public accountants, or other outside consultants to assist in the development of modern organizations, systems, and procedures. The development of improvements, in each case, reflects the progressiveness and the ability of each operating agency to replace outmoded methods by the best of modern methods suitable for its operating needs. The response of agency management to this challenge over the last ten years is deserving of high commendation.

The areas requiring attention in each agency varied. In some it was only inventory accounting, in others cost accounting, in others all accounting. In some it was budgeting practices and procedures, in others it was the funding procedures (allotment system) that required attention. In some the organizations performing financial management functions needed strengthening or streamlining, in others internal audit and other internal review mechanisms required development. In many it was bringing all the parts together so as to produce an integrated system of financial management for programing, accounting, budgeting, and financial reporting.

The scope and the depth of the effort required are too diverse to be completely compressed into a general summary. However, Public Law 863, 84th Congress, contains legislation in four specific areas of the improvement effort. These are (1) accrual accounting, (2) cost-based budgeting, (3) synchronized classifications, and (4) simplified allotments. The June 30, 1958, status of each agency's efforts to reach these goals, as reported by each agency is shown in Part III of this report.

Economy and Efficiency

All of the improvements advocated and developed under the Joint Program add up to one thing—improved financial management tools to be used by all levels of management in promoting increased economy and efficiency in Government operations. The effectiveness of the improvements during the past ten years is best demonstrated by the benefits that management has derived through the use of modernized financial management systems.

One view of the impact of these improvements is whether they are more costly or produce administrative savings. This is a natural question that represents a pertinent consideration in any Joint Program proposals to change existing practices. The emphasis which has been placed on financial management improvements during the past ten years under the Joint Program, and the concern whether this has required a substantial increase in accounting, budgeting, and other financial management personnel throughout the Government, motivated the Subcommittee on Manpower Utilization of the Committee on Post Office and Civil Service to look into this subject this year. In its study, the Subcommittee compared the personnel employed in financial management functions at June 30, 1950, and at June 30, 1957. The report issued on August 7, 1958, as the result of this study (House Report No. 2512) contains the following as the first finding of the Subcommittee:

During the period 1950–57, or since enactment of the Budget and Accounting Procedures Act of 1950, departments and agencies, exclusive of the Department of Defense, were able to achieve a reduction of 15.4 percent in personnel performing financial management functions. It is significant that, in a number of instances, reductions were made in financial management personnel through more effective systems and procedures despite level or increased program activities of the departments and agencies. This information clearly indicates that (1) increased program activities and appropriations do not automatically mean an increase in financial management personnel is required and (2) real economies in the use of manpower are possible where effective effort is made to modernize and streamline agency financial management functions.

In numbers, the civilian agency financial management personnel included by the Subcommittee in this reduction of 15.4 percent were 39,644 at June 30, 1950, and 33,552 at June 30, 1957, or a decrease of over 6,000. Translated to dollars, this represents an estimated annual reduction of over $30,000,000[1] in salary costs alone. In addition, the Subcommittee reported a net reduction of over 1,200 employees in the General Accounting Office, resulting from discontinuance of bookkeeping activities and other changes in the operations of GAO, with an annual savings in salary costs of $3,364,000.

These figures are cited as indications of administrative savings in financial management functions since the Joint Program started but not as absolute figures. The Subcommittee was unable to obtain data on which comparison of total financial management personnel in the Department of Defense as of June 30, 1950, and June 30, 1957, could be made, but such data for 22 selected comptroller organizations revealed substantial increases between the two dates. Also, in a later report, the Subcommittee called attention to the trend toward higher graded positions throughout the entire Government service. These matters are being studied further by the Subcommittee.

In the broader area of the benefits to management from better financial data for program decision-making, it is more difficult to assign dollar amounts to resulting savings. However, the annual reports issued under the Joint Program contain many illustrations of how management was more effective because of the better information. As one example, better control was possible over inventories because of improved property accounting and property reports. Before the Joint Program started, monetary property accounting, and even adequate

[1]Based on average annual salary of $5,013 for accounting and budget personnel as shown in Table 2 of the pamphlet, "Occupations of Federal White-Collar Workers, February 28, 1957," now being printed for publication by the Employment Statistics Office of the Civil Service Commission.

quantitative property accounting, was the exception in the departments and agencies of the Government. Today many agencies have installed and are using property accounting systems to control their inventories in monetary and quantitative terms. In 1953, the *Department of the Army* reported that it had developed, and was in the process of installing, a financial property accounting system for the worldwide inventories of the Army Establishment to provide the Army supply management with better financial management data to accomplish its supply mission. Army stated that it is not possible to estimate accurately the probable savings which will result from more effective supervision of procurement and stock levels with the aide of the necessary financial data—however, some sixty (60%) percent of available Army funds are invested in or scheduled for procurement of supplies and equipment and a reduction of investment of only ten (10%) percent would approximate over one billion dollars. In the same year, the *General Services Administration* reported that the inventory record in use in the Emergency Procurement Services was redesigned to include additional data such as ore content, grades, wet weight, etc., needed by operating divisions and that coincident with this redesign the number of active inventory cards would be reduced from approximately 80,000 to 5,500. In 1954, the *Department of the Navy* reported that improvements in supply management control disclosed $1.9 billion in excess and obsolete stocks of which $1.35 billion has been scheduled for disposal. In the Navy Stock Fund alone, improved inventory management achieved a reduction of nearly $500 million in stock levels with an additional reduction of more than $80 million in the annual rate of procurement. In 1956, the *Farmers Home Administration of the Department of Agriculture* reported that as a result of an intensive survey of nonexpendable property, 2,500 items aggregating $62,500 were released, 1,800 items were set aside for planned reserve, and the major portion of unserviceable property was eliminated. In 1958, the *Department of Health, Education, and Welfare* reported that an inventory of nonexpendable property at Saint Elizabeths Hospital consisting of over 100,000 items was about 80 percent complete, and the improved property accounting system will permit the systematic and efficient utilization and replacement of property. These are but a few of the several illustrations contained in the annual progress reports of the last ten years regarding benefits to supply and procurement managements from more effective financial methods and data developed since the start of the Joint Program.

Another aspect of the Joint Program which has resulted in manage-

ment benefits has been the development of cost data as a basis of preparing budgets and evaluating performance of assigned programs, functions, and activities. In this development all significant costs and resources are brought into focus in the decision processes, and not just the amount of obligations and cash disbursements.

In 1952, the *Department of Defense* reported, in connection with installations financed that year by industrial funds, that the new accounting systems and procedures place major emphasis on the requirement of local management officials at all supervisory levels for timely and accurate cost reports to provide them with the means of operating activities on a more efficient basis, and that analysis of unit costs resulted in the elimination of overtime and highlighted the need for flexibility in production scheduling and the responsibility of procurement officials in getting materials to the activity when needed. In 1954, the *Government Printing Office* operated under revised financial management systems developed the previous year, including a revised cost accounting system, and reported that these improvements, together with collateral developments, substantially contributed to a 5 percent reduction during the year in most rates used in billing for services rendered various departments of the Government. In the same year, 1954, the *Post Office Department* reported that a standard cost accounting system was installed for the Mail Equipment Shop and that the introduction of better management techniques, including proper use of meaningful cost information supplied by the new system, achieved an 11 percent increase in operating efficiency. In 1955, the *Department of the Interior* reported that revised systems of 7 of the principal bureau-type organizations of the Department develop costs on an accrual basis reconcilable with fund controls under an over-all financial plan of integrating budgeting, programing, accounting, and reporting activities. The *General Services Administration* reported that an accrued cost system of accounts, developed as a part of an integrated budget, accounting and reporting system, was put into effect July 1, 1956, for use in connection with budget control, operating cost control, and budget estimates. In 1957, the *Atomic Energy Commission* enumerated many ways in which product unit cost data are being used by management in making decisions when comparative operating costs at various plants have an important bearing on the action to be taken. In 1958, the *Department of the Interior* reported that the accounting system of Bonneville Power Administration relates costs to production units of work and the accounting, budget and organizational classifications are related so that charges can be determined by activities, by organizational units, or both.

These are but random selections from the many illustrations in the several annual progress reports published under the Joint Program concerning the benefits to agency management from the improvements in Government financial management practices since the Joint Program started. In addition to these types of benefits, and the resulting contributions to better economy and efficiency, the annual progress reports are replete with examples of savings through simplifications in forms, reports, and processing procedures of the agencies, and, in general, through the elimination of "red-tape."

The contributions to better financial management practices in the departments and agencies were made possible, in a significant manner, by improvements in the related financial management practices of the central agencies, i.e., the General Accounting Office, the Treasury Department, and the Bureau of the Budget. This is because the central agencies have certain responsibilities in financial matters that are governmentwide in scope and require that the central agencies prescribe or otherwise influence the methods which the executive agencies employ in financial management matters. Financial management practices in the Government therefore, have a two-fold aspect, (1) for internal use by the operating management of each executive agency and (2) for governmentwide use in the total financial management of the Federal Government.

Consideration of these two aspects requires central control on a broad basis that will allow sufficient flexibility in details to permit development by each agency of the methods that will most nearly fit its particular management needs. Before the Joint Program started, the central agencies tried to prescribe rigid patterns to be followed in detail regardless of differing operating agency needs and, quite often, maintained financial records that duplicated records maintained elsewhere in the Government. This has been changed under the Joint Accounting Improvement Program.

The General Accounting Office is no longer a bookkeeping office which duplicates the records maintained in the executive agencies and in the central accounts of the Treasury Department. It abolished its Accounting and Bookkeeping Division which kept accounts related to all appropriations, and its Postal Accounts Division which kept the detail accounts of the Post Office Department. In place of the emphasis on across-the-board uniformity in accounting procedural details, it developed accounting principles and standards to be observed by the executive agencies in developing the accounting systems best suited to their management needs. It strongly endorsed and implemented legislation which simplified the settlement of claims under lapsed appro-

priations which previously had to be sent to the General Accounting Office for settlement, and the accounting for such charges. It moved rapidly from an audit approach which required all agency financial documents to be sent to the General Accounting Office for central voucher audit, to more comprehensive audits at the site of agency operations. All of these major changes eliminated many rigid procedural and paperwork requirements on the executive agencies. The resulting economy in the salary costs of the General Accounting Office from these and other improvements has been noted in House Report No. 2512, previously cited; the corresponding contributions to improved financial management practices in the executive agencies have not been specifically measured for the entire Government.

Restrictive requirements with respect to the receipt and disbursement of Government funds, such as the requirements for the issuance of warrants, have given way to a unified system of central accounting and reporting in the Treasury Department for the Government's cash operations, integrated with the appropriation accounting of all departments and agencies. Requirements for cash and other data as related to appropriations by the Bureau of the Budget and the Treasury Department have been substantially coordinated and consolidated with elimination of different sets of requirements on the executive agencies. The three central agencies have worked together closely to eliminate duplication or conflicts in the regulations and other instructions they issue to the executive agencies in financial management matters.

In the performance of their individual responsibilities, the central agencies have developed a high degree of joint effort. An outstanding example during the last ten years was the development of an electronic processing system for the payment and reconciliation of Government checks. These functions were previously performed separately by the Treasury Department and the General Accounting Office; now they are combined in a single electronic system in the Treasury Department with comprehensive audit at the site by the General Accounting Office. Annual savings in excess of $1,700,000 resulted from this improvement, a substantial portion of which represents manpower savings (previously noted in this report) in the General Accounting Office and Treasury Department. In addition, it is estimated that the Federal Reserve Banks save $500,000 per year.

The success of the Joint Program, in the final analysis, requires the dedication of competent personnel, without whom little could have been accomplished in the past and little could be hoped for in the future. The role of the Civil Service Commission has been and con-

tinues to be vital in the recruitment, training and retention of such personnel, and in related matters such as the development of classification standards for financial management positions.

Related to the Joint Accounting Improvement Program over the past ten years has been the gradual extension of the comprehensive audit program of the General Accounting Office. This program was established by the Comptroller General in 1949 as a means of better discharging his independent auditing responsibilities relating to the affairs of all Government agencies. This type of audit provides for a study and evaluation of the manner in which agencies carry out their financial responsibilities and due consideration is given to the effectiveness of agency management and financial controls in carrying out detailed examination and verification work. Generally, this type of audit is performed at the sites of agency operations. In some cases, however, provision has been made for continuance of the practice of submitting fiscal documents to central points for GAO examination, leaving other phases of the audit work to be carried out at agency sites. The comprehensive audit program is a contributing factor in promoting continuing improvements in financial management practices in the Government.

The Future Course of the Joint Program

How far has the Joint Program progressed toward its ultimate goal of obtaining, in all of the activities of the Federal Government, the most modern and streamlined financial management practices geared to the many management needs in Government? It is impossible to generalize as to the degree or percentage of completion of the total effort required. Indeed, it is most difficult to generalize about this with respect to a single department of the Government such as Defense, Agriculture, Commerce, and others which have many and large organizational subdivisions (bureaus, offices, commands, etc.) with different types of programs and differing needs for financial data. However, the record discloses that the progress made during the last ten years has been substantial, and that it is continuing with unremitting vigor.

Efforts will be continued to develop basic improvements in areas of activities where they are still to be installed, to refine them in the areas in which they have been installed, and to find techniques whereby the information developed is most useful as an aid to all levels of management in the Government. The Joint Program will endeavor to keep abreast of new financial management methods, procedures, and other techniques as they are introduced, so that they may be applied

to Federal Government financial management functions, to the extent appropriate, in furtherance of increased economy and efficiency in Government operations. One of the most significant of recent developments in this respect is the use of automatic data processing systems, more fully discussed in Part II of this report.

Thus the need for the Joint Accounting Improvement Program will be continuous. This continuing need was thus expressed in the recent pamphlet[1] explaining the Program:

> This Program is a continuing one which will never be completed, in the sense that there is always room for improvement in the Government's vast operations. The techniques of financial management are constantly being refined, and the problems to be resolved are continually changing as the Congress provides for new activities or makes changes in existing Government programs. One of the greatest assets of the Joint Program is that it provides a flexible framework capable of dealing with constantly changing conditions. Under these arrangements, financial management in the Federal Government need not become outmoded by its failure to keep pace when other aspects of operations change.

[1] "The Joint Program for Improving Accounting in the Federal Government—Its Scope, Objectives, Concepts, and Methods" which was prepared by the Bureau of the Budget, Treasury Department, and the General Accounting Office.

Samuel N. Alexander

Future Developments of Electronic Data-Processing Systems

The improvement of data-processing equipment is contributing to the development of integrated systems of information which will replace the present loosely connected systems of accounting, supply control, and the like.

The four functions of an information system are data collection, data processing, presentation of output data, and feedback. The feedback arises when management takes action and affects the activities, which in turn changes the data being fed into the system. The data-collection function has lagged behind data processing, requiring manual effort to translate from the original document to the punched tape or cards which the data-processing machines require.

Mr. Alexander is Chief, Data Processing Systems Division, National Bureau of Standards. This paper is based on a speech given at the Eighth Annual Symposium of the FGAA.

THE title for this talk suggests more emphasis on the trends in equipment development than might be of general interest to this group. Accordingly, I propose to approach this topic from the viewpoint that the increasing availability and power of data-processing equipment is going to contribute strongly to the growth of integrated systems of information to serve management purposes. Such management information systems are destined to supplant the

present loose federation of accounting systems, property and supply control systems, personnel records, sales or activity records, scheduling and cost-control systems, and other such operational and planning records. These are the dispersed sources presently available from which managerial information is extracted today.

This trend is gathering momentum with the growing appreciation that there soon will be the technical means for having a fully integrated system of management information. I feel certain that most of you have already sensed this trend and look forward to the opportunity to provide more than conventional historical and investigative functions for the management of your agencies. Because of the limited time, I plan to cover only a small number of equipment examples in this talk. These have been selected for the purpose of highlighting the points under discussion. There is no intended implication of a "seal of approval" for the technical merit of the equipment chosen for mention. Neither should this brevity of coverage leave the impression that there is a limited array of equipment from which to choose.

In less than a decade a bewildering array of computer-derived equipment has been adapted to serve the data-processing needs of industry, business, and government. The first installation of this sort was put into productive use during 1951 by the U.S. Census Bureau. The first installation for a business activity was completed in 1954 for the Metropolitan Life Insurance Company. More than a thousand automatic data-processing systems of all sizes have now been installed, and there are many more in prospect.

From the very outset, the capability inherent in these new facilities was not fully recognized. There has been an understandable but erroneous tendency to regard them simply as superfast office machines having essentially the same attributes and limitations as conventional office machines. This misguided attitude, as much as any other factor, has contributed to extending the delay between reasonable expectation and actual realization of the improved management information systems being sought by industry, business, and government.

Existing management information systems are based on a judicious use of both office machinery and clerical staff. Such systems have arrived at an acceptable balance among their primary functions of data collection, data processing, and the presentation of

output data for consideration by management. In order to have a complete cycle, there is an additional function called "feedback," that serves to connect the output presentation back to the collection of input data. This connection usually takes the form of management directives that have in part been initiated by the information in the output presentation. The resulting responses to these directives then affect the activities, which in turn result in alterations in the source information for the data-collection function.

The relationships just described among the four functions of data collection, data processing, output presentation, and feedback have a pattern that is strongly suggestive of a parallel pattern found in many self-regulating mechanisms. Indeed, even wider parallels can be recognized in the elaborate automatic control systems used in modern chemical process plants. Such comparisons provide useful inspiration for re-examination of the ideas that we have about interactions among the primary functions of a management information system. However, we must keep in mind that, in making these comparisons with a self-adjusting control system, proper allowance be made for significant points of dissimilarity. This is necessary to avoid overdrawing the analogy and thereby arriving at unwarranted inferences.

This leads to an interesting observation that can be drawn from the comparison of management information systems with automatic control systems. There should be a balanced distribution of time lags among the four primary functions in contributing to the total time delay for a complete cycle of events. The importance of the interrelationship of these time lags to the over-all performance of an automated control system is well recognized. Moreover, they can be put in proper balance because the over-all system is planned as an entity and not assembled in piecemeal fashion. The need for a similar approach to the design of management information systems is implied by this analogy, and the march of technological improvements is an added impetus to this same end. Otherwise, the transition to an automatic data-processing system will simply lead to a "hurry and then wait" type of operation that will represent a disappointing initial realization of the inherent potential of the new technology.

These technological advances are being introduced much faster

than we are growing in our abilities to exploit fully the available capabilities. This situation tends to be obscured by a preoccupation with trying to keep up with the readily identifiable electronic features. This in turn tends toward giving an undue weight to considerations of obsolescence in planning to apply automatic data-processing equipment. The improvement in over-all capability inherent in "next season's model," as compared with "last season's model," hardly justifies the concern over wholesale early replacements. When measured in terms of over-all costs of operation per unit of work processed, there is no advance assurance that it will be profitable to replace abruptly a smoothly operating installation. The operating benefits to be gained from new equipment features must be weighed along with the equally important costs and time needed to modify automatic procedures and convert them into operating programs.

The obsolescence problem can be kept in perspective by recognizing that the major opportunities for improvement reside in the transition from a predominantly manual system of processing to any well-planned automatic system. While the replacement of one automatic system for another composed of better equipment can bring its share of improvements, these improvements are hardly ever of the scope that was available for the initial transition.

In light of recently announced new characteristics for forthcoming equipment, the pace in technical innovation is hardly leveling off, and it even appears to be gaining momentum. The latest electronic technology, such as magnetic amplifiers, magnetic cores, and transistors as well as revised logical organization, are all being promptly pushed into new designs. Much of this acceleration in tempo is the consequence of vigorous competition for a new market. The current half-billion-dollar market for all sorts of computer-derived equipment must have seemed very remote fifteen years ago when the ENIAC project was started.

Although data-processing equipment has developed with unexpected rapidity, there has not been comparable progress in equipment associated with the gathering of source data and getting it to centralized locations for processing. This has been due to a variety of technical and operational difficulties, which often tend to reinforce one another. As a consequence, there are still no efficient

means for transcribing from the information records suited for human activities over to the mechanized formats suited to the input needs of present data-processing equipment. There is a growing realization that the expenditure of effort represented by a centralized "key-punching" operation is an exceedingly inefficient procedure for transcribing from handwritten or typed documents over to punched tape and cards. The argument applies even more strongly for transcription onto magnetic tape.

We have already heard from a previous speaker about the development of printing arabic numerals with magnetic pigment as a means for simplifying the transcription of bank check information over to a mechanized format. The development effort needed for this program is characteristic of that which is needed to make headway in the deceptively difficult area of data collection.

An early attempt to reduce some of the load of centralized key-punching operations took the form of "mark-sensed" cards, a technique that is probably familiar to most of you. For this technique, the information is indicated by the location of marks made with a special pencil or pen within prearranged fields on a form. For a number of technical reasons, this initial embodiment has only limited applicability for collection of data in the field.

Recognizing that data collection would soon have enhanced significance as a consequence of their pioneering experience with electronic equipment for data processing, the Bureau of the Census initiated a program to adapt the "mark-sensing" type of data representation to their special field conditions. This approach was selected because of new technical possibilities and the appreciable segment of field data that the enumerator could designate by marking off or underscoring selected items on a preprinted document. The use of an electronic-optical technique for sensing the mark on the form made it feasible to meet the demanding field conditions, provided that the documents were initially copied onto a roll of microfilm. This film was automatically inspected and interpreted by the reading device, called FOSDIC, into electrical signals that are recorded on magnetic tape in the format appropriate for direct computer input.

The success of these experiments has encouraged others to attempt the more demanding development of transcribing directly

from the marked document onto the magnetic tape, without resorting to the assistance that can be had by using the microfilm as an intermediary. It should be noted that in either of these approaches there is considerable care taken not to interfere with the primary function of the enumerator, that of collecting data effectively while starting the mechanization of the data-transcription operation out in the field. These contradictory objectives tend to make the development difficult and the equipment complex.

More prosaic examples that seek similar goals are found in inventory control and supply operations. Experiments and trials in these areas have made use of relatively inexpensive punched paper tags and embossed aluminum labels. These are attached to the items of inventory for basic identification purposes, yet they also provide simple means for initiating the automatic transcription of the detailed catalog and status data over to mechanized format. In a similar way, "credit cards" can then be added to characterize the "customer" in the actual transactions. Such prearranged data sources can be transferred into the transaction record by means of devices similar to cash registers, which also supply the clerk's identity and the specific transaction data through the keyboard.

A primitive form of such a device that has received public attention is the agent's set used in the Reservisor System for airlines space-reservation purposes. The example of airlines reservations also includes the use of electrical communication techniques for gathering the data from many transaction locations and passing it along immediately to a remotely located processing center. This is an effective way to proceed so long as the transmission links are essentially local circuits within a limited area. Once the distances become large enough to require a substantial outlay for the rental of telegraph or telephone lines, the cost of such service needs to be weighed against the volume of traffic and the responsiveness required for the class of transactions being processed. The considerations are reasonably clear-cut for the case of airlines reservations, but there are numerous other instances for which the issues concerning whether or not to use digital communication services are not so simply resolved.

The following example will illustrate this point: A 2,000-foot roll of magnetic tape can easily record over one million alpha-

numeric characters of data. In binary or pulse units, this is of the order of ten million bits of information. Since there are roughly 100,000 seconds in each twenty-four hour day, a transmission rate of 100 bits per second is needed to send all of the data on one roll of tape within the day. This rate corresponds to that available from high performance TWX telegraphic circuits. There is now becoming available a digital data service at about 1,000 bits per second over long-distance telephone circuits. Thus, each circuit can handle about ten rolls of tape per twenty-four-hour day, and this would very likely be at a lower unit cost whenever the transmission of such volumes are regularly required. By comparison, airmail delivery of these same ten reels can be had to most locations in the United States within the same twenty-four-hour interval and probably at a considerably lower cost. Thus, there is an apparent need to arrange for the fractionation of the collected data into several priority classes with respect to the responsiveness required for the processing, presentation, and feedback functions.

Our understanding of these considerations will grow as the crystallized experience from current pioneering applications emerges. However, we are still in the early phases of learning how to attain progressively improved balances among these four primary functions of a management information system. We are gradually learning how to make optimal use of the improvements in the automation of data collection and processing. There is little doubt that a greatly increased effort will be directed toward finding better balances among these four functions that is consonant with the natural responsiveness of the enterprise being served. The reason that I can express this prediction with confidence resides in the rich prize of increased operational effectiveness for those enterprises that acquire modern management information systems.

Kenneth G. Cadematori

Auditing Automated Data Processing

Automated data processing has caused considerable concern among auditors. The basic problem relates to the lack of an audit trail, as is normally found in other accounting systems. This is particularly true in the case of machines having random access memory devices, in which prior transactions are eliminated with each new transaction. Fortunately the auditor's information needs are generally the same as those of management, and, where they are different, the problem can be solved at the time of the original programing. The basic techniques used by the auditor relate to a check of the programing and operation of the system and to a check of the records produced by the system. Adequate control over input data is essential in both cases. Instead of limiting the auditor in the performance of his function, ADP systems actually afford the auditor an opportunity to carry out a more extensive and effective audit in organizations having a high volume of transactions.

Mr. Cadematori is a Manager, Price Waterhouse & Company. This paper is based on a speech given at the Eighth Annual Symposium of the FGAA.

IN the 100-year life of the auditing profession, seldom has any change in the methods of record keeping caused such great interest and concern among auditors as has automated data processing. The considerable attention being given to this subject is an indication that there is as yet no conclusion to which all will subscribe.

To some auditors, automated data processing must be approached with suspicion, for it brings with it such problems as "invisible records," that is, numerous complex computations and logical decisions made by electronic circuits, with the results stored as magnetic bits on reels of Mylar tape. There is also the danger caused by the elimination of the controls normally provided by human review and division of duties: the essential feature of automated data processing is that the data processing is done entirely by electronic equipment, which is controlled, and often understood, by only a few employees.

Contrary to those auditors who look upon ADP with suspicion, there are those who have nothing but high hopes for how it will affect auditing. My experience and that of my associates indicates there is truth in both of these contrary positions. But one position holds much greater significance for the auditor. To determine which, we must begin by first placing ADP in its proper perspective with regard to the objectives of the auditor.

AUDITING OBJECTIVES

The objectives of auditing can be reduced to three essential functions. They are:

1. To determine that the source-accounting data validly records the occurrence of a transaction or the existence of an asset or liability.
2. To check the accuracy of the processing and summarizing of the source-accounting data.
3. To review the completeness of the disclosure of the processed and summarized data in financial reports.

The greatest impact of ADP on auditing is, of course, on the second objective, that of checking the accuracy of the processing and summarizing of source-accounting data. It is here that the information trail followed by the auditor has been altered. The intermediary listings and summaries, common to manual and mechanical accounting systems, are not found in well-integrated automated data-processing systems.

CONVENTIONAL AUDIT APPROACH

How under such conditions can the auditor carry out his con-

ventional audit techniques? This has not been the problem it was thought to be. The auditor will generally find that management has taken advantage of the high speed of electronic printers (500 to 900 lines a minute) and their flexibility to produce extensive print-outs of the results of the data processing. The information contained in these print-outs usually exceeds that formerly available. Frequently the print-outs will contain in one organized listing data that was previously included on a number of intermediary listings or in tabulating card files. Typical of the print-outs of an ADP system are:

1. Payroll registers recording weekly, and even year-to-date, salary and tax amounts; the full details of as many as thirty deductions; hourly pay rate; position title; accrued sick leave; and the like.

2. Material issued from inventory may appear in two records, each showing quantity, price, and extension, the first in stock-number sequence and the second in order by account charged.

3. Cash receipts listings showing the usual payer information and amounts and also the batch and sequence number in which the transmitting documents are filed.

Obviously such print-outs will provide the auditor with the full details of the data processed and give him a direct reference to the source documents necessary to check the accuracy of the processing. Those of you who have struggled to reconstruct transactions recorded only on uninterpreted tabulating cards, I am sure, will appreciate the ADP print-outs.

IN-LINE ACCOUNTING

I have been encouraged to find that even the form potentially most difficult to audit in automated data processing — the in-line accounting system using a large permanent internal storage — has not in my experience proved to be a great problem for the auditor. As an example I can cite an IBM 305 Ramac used at an Air Force base to record and control supplies and to prepare and price charge requisitions for material issued to other bases.

As in most systems of this type, the current data being posted to the internal storage wipes out the prior information, leaving no record of the prior information. In this installation each issue and

receipt is posted to the internal memory, updating and eliminating the previous balance stored there. Each receipt also creates a new average cost which wipes out the previous average cost; as the prior balance of quantity and dollars is also eliminated, no information is left to allow the checking of the computation of the new average price.

However, the auditor's case is far from hopeless. First, he has complete print-outs of each day's transactions. Each stock item identifies the date of the last previous transaction, permitting direct reference to the appropriate transaction print-out. A second audit trail is provided by the input tabulating cards, which are filed by stock item.

The explanation of why the auditor has not had difficulty in finding an audit trail in ADP systems is understandable. The information needed by the auditor to satisfy himself is usually the same information that management requires with greater frequency to operate and control the organization. While the auditor may require the details of amounts owing to the organization once a year for the purpose of confirming with the debtor, management requires the same data throughout the year for answering inquiries and checking credit limitations.

SPECIAL AUDIT TRAILS

Before proceeding further, it should be made clear that my comments on the adequacy of audit trail in ADP systems apply to the conditions usually encountered. There have been occasions when the auditor has had to require specific provision to be made in the ADP system to provide him with a practicable audit trail. But this situation — where the information is required solely for audit purposes — is rare and can usually be simply resolved at the time of the original programing. This is one of the strongest arguments for having the auditor participate in the planning stage.

A second type of request the auditor has had to make is that source input data be sufficiently controlled, reviewed, and approved to serve as suitable evidence of the propriety of the transactions. There is a tendency to overautomate the preparation of source documents and their authorization. In this desire for efficiency it is sometimes forgotten that in addition to serving as input

to the processing system the source record must fix the responsibility for the transactions. This is necessary for the investigations made by the auditor and is equally necessary for the proper functioning of management.

SIGNIFICANCE OF ADP FOR AUDITING

If, as I have indicated, ADP has not presented an insurmountable challenge to auditing, you may rightfully ask: "Does it hold any vital significance for auditing?"

This can be answered in two ways. First, most ADP installations to date have been rather conservatively planned and frequently confined to functions such as payroll and stores accounting, which are easily controlled. However, as management's experience and confidence grows, we are witnessing a move into less controlled areas and, more significantly, to the use of ADP to perform management control functions themselves. An oil company has developed an application whereby the system, when processing inventory transactions, will detect low stock balances and automatically issue purchase orders to replenish the stock. When the material is received, the receiving report and invoice date are entered into the system and are compared internally with the previously stored purchase order information. If all is in agreement, a check is prepared for payment. (Of course, the check is signed by a check-signing machine.) In effect, the entire vouching operation and payment authorization is performed without human review!

This use of ADP to perform such management control functions without any visible evidence of review or human authorization poses obvious headaches to the auditor.

Matters will be made still more difficult as the growing trend toward "management by exception" becomes widespread in ADP applications. The "management by exception" approach to ADP is to have the system print only the details of conditions requiring action by management. Reliance is placed on the equipment's decision that all other conditions are normal and that management need not concern itself with the details thereof. Such details will be recorded only in internal memory or on magnetic tape. Can the auditor accept the decision made by equipment? Does he fulfill his responsibilities by placing a trust in electronic circuitry

that he would not place in operating personnel? I think not, so long as there are personnel who direct, and can misdirect, the electronic system.

Accordingly, the first reply to the question of what significance ADP holds for auditing is that ADP applications are becoming both bolder in their extension to management control functions and more sophisticated in the use of management by exception techniques. These advances will present new audit problems not generally encountered in earlier installations. They will require the auditor to develop new techniques for satisfying himself in the absence of visible records and human review and authorization.

OPPORTUNITY FOR AUDITING OF ADP

The second reply to the question of what significance ADP holds for auditing is a corollary to the first, but it is of greater importance in its own right.

The reply is this: We have all witnessed the continuing growth in recent years of large organizations (both in business and in government). Such organizations participate annually in millions of transactions. In this type of organization top management is considerably removed from the details of operation. They need the services of auditors to assure them of the reliability and completeness of information presented to them about the operations. Yet, in this circumstance where he can be of greatest value, the auditor is restricted to general and over-all comments, because with his manual checking techniques he cannot economically penetrate the millions of transactions in order to check individual transactions.

It is my belief that automated data processing is the salvation of the auditor in these circumstances. By learning and using its abilities, the auditor can quickly and economically penetrate the huge number of transactions and determine which belong to the overwhelming majority that are normal and correct based on standards established by the auditor. Aided by ADP, with a minimum of effort he can isolate, and to some extent even check, the individual unusual transactions requiring his attention.

In summary, I believe the auditor, and here I mean principally the internal auditor and to a lesser extent the external auditor, is afforded an opportunity, by using ADP for his purposes, efficiently

to restore much of the check of details he was forced to eliminate in the face of the growing size of organizations. In using ADP for his purposes, the auditor will find that he has at the same time resolved the need to develop new techniques to audit ADP.

USING ADP TO AUDIT

How may the auditor use the ADP equipment to aid his examination? This is not a new subject. It has been considered by auditors for the past few years, and certain techniques have been developed and put into practice. These techniques fall into two general categories: first, those designed to check the programing and operation of the system; and, second, those designed to audit the records produced by the ADP system.

Program Control

The use of the program-control techniques has been suggested where the auditor has been very close to the development of the system and has reviewed and checked the instruction program designed to operate the system. All subsequent changes to this program must also be submitted to the auditor for his review and inclusion in his copy of the program.

The auditor can make use of his copy of the instruction program in two ways:

a) He can, on a surprise basis, have his copy of the program compared with the program used during the actual processing of data. This should establish whether the program used for actual processing is the authorized program.

b) The auditor may request that data previously processed with the operating copy of the program be reprocessed with his copy of the program and the end results compared. This method has the additional advantage of also checking any intervention by the machine operator.

Although the successful use of controlled copies of instruction programs has been reported, a word of caution is in order. Often in the early stages of the use of a program a great many changes are required by events brought to light by the actual operation of the program with live data. In addition, subsequent major overhauls are usually required to reassemble the program to smooth out the

patches. Major program changes are also required to adopt the program to equipment modifications, which occur with surprising frequency as the equipment manufacturers make further improvements. These continuing program changes can create a heavy burden for the auditor to stay abreast with, if he is to review and check all significant changes in order to be satisfied with the operations performed by the program.

I do not wish to imply that the program-control technique is not useful to the auditor. As I stated previously, instances have been reported where auditors have successfully used this technique. However, care must be given as to when to attempt to establish a control copy of the program. It would be well for the auditor to wait until the many changes occurring in the initial years of an application have subsided before obtaining a copy of the program and establishing it as a control copy by review and check.

Test Cases

Another technique for checking the programing and operation of the ADP system is the use of test cases. This technique does not differ in substance from that used in many tabulating card installations by both the operators and auditors. In such installations it is common to run certain test data through a machine operation in order to determine by comparison with the predetermined output that the equipment is working properly and as programmed.

In electronic computer operations similar test data is used by programmers for debugging programs being developed.

The auditor may also use this technique to check the operation of the program and the system. In fact, the test data prepared by the programmers for their purposes may very well be retained by the auditors and modified to suit their purposes. The test data used by the auditor should deliberately include data which will violate controls programmed into the ADP system. For example, if the system has been programmed to print as an exception any payroll item in excess of, say, $200, the auditor should include test data which will result in a payroll item in excess of $200 in order to determine whether it will be reported as an exception.

The most effective use of this technique by the auditor is on a surprise basis, that is, when the actual operation which the auditor

wishes to check is being processed. The auditor should request that the operating program be left in the computer at the completion of the processing so that he may process his test data with it.

The technique of test cases is usually not affected by changes in the program, as are the program-control techniques. This is because most of the program changes occurring are to correct errors in the program or to permit more efficient operation. The form of the input is usually not altered. Therefore, the format of the test cases need not be changed.

Electronic Audit Programs

The second type of audit technique made possible by ADP is the use of the equipment to test records produced by the system, rather than to test the system as just discussed. The approach of testing records is, of course, the historic approach of auditors. It has the advantage of permitting the auditor to test the results of operations of many periods at one time. In contrast, the tests of the system's operation previously mentioned require the presence of the auditor during each period or cycle to be tested. Also, as might be expected, tests of operations performed in the absence of the auditor are more revealing of the normal conditions than are tests of operations executed in the presence of the auditor.

Using the equipment to test the records requires an instruction program to be prepared for the specific purposes of the auditor. It may be a program separate from the operating programs; or it may be incorporated in the operating program as a loop, which can be brought into operation by means of an alteration switch.

Of the two methods, the separate program is the preferable. It gives the auditor greater flexibility as to when he will use his program; that is, he need not carry out his audit when the operating program is being processed, nor need he confine it only to data being processed at that time. Also, it permits the auditor to retain the program under his own control. Thus, he can withhold from the ADP personnel specific knowledge of the program's operation and not allow them any opportunity to alter the program.

The advantage of incorporating the audit program in the operating program is that it then does not require an additional computer run to use the program. This may be very significant on fully loaded ADP systems.

The technique of including in an operating program a loop of instructions for the auditor's use is a valuable device where management has adopted the "management by exception" concept and has provided a visible record only for the information it requires for management purposes. By engaging this extra loop of instructions, the auditor, for the period he wishes, may obtain a print-out of additional information required for audit purposes.

Electronic audit programs can perform four functions for the auditor:

1. They can check the details and total the information stored on tape or internal storage. For example, if inventory data is stored on tape or in internal storage, the individual price extensions can be checked and a total accumulated by an electronic audit program.

2. The electronic audit program can select items for further testing by the auditor and supply the specific information needed for such testing. The selection can be made of the unusual items, that is, items outside the standard of reasonableness established by the auditor (for example, accounts receivable unpaid for more than 90 days), or the program can select items for testing on the basis of some statistical sampling technique, such as, random numbers or systematic selection.

3. Electronic audit programs can be used to analyze the details in a form which the auditor can use to interpret their significance. For example, a program can compare two payrolls. The difference between the two payrolls can be analyzed to determine how much of the difference is due to more employees and how much is due to overtime hours or higher rates.

4. Electronic audit programs can be used to perform mechanical functions, such as preparing confirmation requests or comparing inventory counts with recorded balances.

BENEFIT OF ELECTRONIC AUDIT PROGRAMS

If you consider these four ways in which electronic audit programs may aid the auditor, you can see why I believe that ADP gives the auditor an unprecedented opportunity to perform effective and penetrating audits of organizations with a large volume of transactions.

1. The audits can be much more extensive in that the auditor

will be able, through the eyes of the ADP equipment, to look at many more transactions.

2. The use of extended audit procedures will be more selective in that the auditor can quickly eliminate the normal items and confine his checking to items selected by his program as having the highest probability of error.

3. Finally, audits will benefit from the greater use of the knowledge and experience of senior audit personnel. This experience can be incorporated in an electronic audit program which will rigidly apply it to every item examined. This has much the same effect as replacing junior personnel with senior. A related and realistic benefit is that senior audit personnel will have more time to make the necessary decisions, because the ADP equipment will reduce their supervisory burden and the amount of normal and correct items to be reviewed.

AN ELECTRONIC PAYROLL AUDIT

To illustrate one of the many types of electronic audit programs that are possible, I would like to mention a program we have used on one of our examinations as part of our audit of payroll expenses.

The client has a 25,000-man payroll, which it pays weekly in cash. The employees are paid on hourly rates. There is stored on magnetic tape a master file for each employee which identifies the employee and gives his number, position, title, rate of pay, number of exemptions, and the accumulative salary and withholding information for the year to date. The only other information required to compute the pay is the number of hours worked, and this is supplied to the payroll computation from the weekly time card.

We obtained a tape copy of the master file tapes during our examination in the previous year and retained these tapes in our possession. During our current interim examination we obtained a tape copy of the current master file tapes. These two master files, together with a tabulating card file of position titles and minimum and maximum rates of pay per the union contract, became the input data for our audit program.

The program itself was planned and the flow charted by the auditors. It was coded by a programmer in the company's ADP

unit. An experienced electronic specialist from our Management Advisory Service Department reviewed the coding and participated, with the company programmer and the auditors, in the debugging and testing of the program. Altogether, the development of the program took less than 300 man-hours and two hours of computer time.

The program checked the following for the six-month period elapsed between the two master files:

1. All terminations during the period were identified. These were employees appearing on the prior master file but not on the current.
2. All hires during the period were identified. These represented employees on the current master file but not on the prior.
3. The rates of pay in the two master files were compared and any changes other than the standard increases provided for by the union contract were printed out for investigation.
4. Each employee was checked to determine whether his current rate of pay was within the minimum and maximum for his position as specified in the union contract.
5. The social security tax withheld in the current year was checked by computation, as was the federal income tax withheld, for each employee.

In an off-line operation on EAM equipment, we compared tabulating cards produced by the electronic audit program for hires and terminations with tabulating cards used by the personnel department to record new hires and terminations.

As a result of the operation of the electronic audit program, we were satisfied that:

1. All new hires during the six-month period were authorized by the personnel department.
2. All employees terminated were removed from the payroll.
3. Each of the 25,000 employees was being paid within the union scale and each received only the authorized wage increases.
4. The deductions for social security and federal income tax were properly made.

We consider this program only a starting point and are presently considering a number of extensions to it, including checking of the total year-to-date pay for each employee and proving the total

year-to-date pay for all employees with the total payrolls for the same period.

However, even the auditing performed by the current electronic program was much more than has ever been practicable in the past. We estimate that to carry out such a test manually would have taken us 5,000 man-hours. Instead, by using ADP equipment we were able to carry out this work in about 50 man-hours and two hours of computer time.

It may be rightfully said that the audit program went beyond the standards of auditing now generally accepted. I readily agree with this. However, the point I wish to make is that with a reduced amount of man-hours we were able to extend the scope of our examination to an extent previously considered impracticable. This is why I believe that ADP offers great new possibilities to the auditor.

AN ELECTRONIC ACCOUNT RECEIVABLE PROGRAM

As another illustration of how an electronic audit program may be used by an auditor, I would like to tell you briefly of an electronic audit program that we are developing to audit accounts receivable and revenue accounting of a public utility client.

As you can imagine, public utilities have tremendous numbers of small accounts, none of which individually is significant in amount. This utility's customers number in the millions.

The program we are developing will make use of the customer master file information (which is similar to the payroll master file information previously mentioned) and the current list of open accounts receivable, both of which are stored on magnetic tape. By passing these tapes through the computer we expect with our program to check at least the following items:

1. That the individual accounts receivable balance with the control total.

2. That the individual customer deposits balance with the control total.

3. That all of the company meters are either being billed currently or are recorded as turned off.

4. That the company's credit and collection procedures are being followed.

The program will also select a number of items of the following types for audit follow-up:

1. Accounts with unusual consumption patterns.
2. Accounts with old outstanding balances.
3. Accounts with credit balances.
4. Accounts not billed during the current billing cycle.

In addition, the program will prepare confirmation requests on accounts selected by a statistical sampling method.

This audit program should give us a degree of assurance about the individual customer accounts which we were not previously able to establish. In addition, it should save us many man-hours of checking details. While I cannot at this time guess at the hours we will save, I believe it will be considerable. One example of the manual effort we expect to save is in the preparation of confirmation requests. Previously it was necessary first to establish that the tabulating card file of accounts receivable was in balance with the control totals before preparing confirmation requests. Those of you who have worked with tabulating cards can appreciate the problems involved in this with cards being out of file for various processing purposes. After establishing the balance, it was necessary to check manually that the information on the confirmation request agreed with the details on the account receivable cards. Now both of these operations will be done completely by the computer in a matter of minutes.

SPECIAL AUDIT TECHNIQUES

In addition to the automated data-processing audit techniques I have just cited, there are other special audit techniques adaptable to the audit of ADP systems by manual means. Unfortunately time does not permit anything beyond mere mention of a few, such as:

1. Using proof totals prepared to guard against loss of data during processing for making over-all audit tests and comparison with control totals.

2. Reviewing the console typewriter print-out and investigating unusual messages.

3. Using the print-outs of processing exceptions for selecting unusual items for testing.

TRAINING THE AUDITOR FOR ADP

The use of these techniques, as well as the previously mentioned techniques of using the equipment to test itself, requires considerable knowledge on the auditor's part of the system and the equipment. No discussion of this subject would be complete without mention of how the auditor can acquire this knowledge. There are three basic steps to follow:

1. Attend a seminar given by the computer manufacturer, preferably of two weeks' duration. Learn what each of the machine components of an ADP system does, how they are directed, and what controls are built in the system. It is not necessary to learn to operate the equipment or to program, but it is important to know how a computer operator may affect the processing and also to understand computer logic necessary for developing programs. If you are interested in developing an electronic audit program, it is well to become acquainted with the bottlenecks in an ADP system so that these can be avoided in order to attain an efficient program.

2. The auditor should participate in the development of the ADP application. Not only will this give the auditor an opportunity to discharge his responsibility for seeing that adequate controls are programmed into the system, but it will also allow him to learn what processing is being done, the form of input and output data, the content and format of internal and magnetic tape storage, and the areas where adequate controls cannot be provided in the system. If the ADP application is already in operation and the key internal auditing personnel have not participated in its development, I suggest that as a minimum they should study the logic flow charts and the content and format of internal and external records. If possible, the audit personnel should assist in the computer room for a few operating cycles.

3. The auditor should stay abreast of current publications on the subject and at every opportunity be quick to share experiences with others interested in the auditing of automated data processing.

CONCLUSION

It is because of this need to share our experiences in auditing automated data processing that I am grateful for this opportunity

to come before the Federal Government Accountants Association. The members of your association in all probability have had much more experience in dealing with ADP than private industry has had. If the members of this organization will apply their knowledge of, and experience with, ADP to the development of new and improved audit techniques, I am sure that you will give the same impetus to the improvement of auditing that you have in the past given to the development of ADP.

Charles R. DeCarlo

Impact of Automatic Data Processing on Management

Automatic data processing is having a profound impact on the type of work performed by management and on the structure of organizations. Organization theory must recognize that new techniques of data processing have changed the amount and character of the information that a person is able to digest. It is inevitable that in the next twenty-five years the concepts of organization and management are going to change. The top management levels of business will determine company policy, using centers of intelligence as their source of information.

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THE function of management can be simply defined as the motivation and control of human effort to accomplish some purpose. An examination of an accounting organization, an industrial firm, or an agency of the government will reveal that the actual structure of that organization is conditioned by the type of information that is processed by its various departments. With the exception of the direct production and distribution of equipment, most of the activity in our government, business, or industrial life takes place in what is called indirect effort, that is, the handling of information. Therefore, it is particularly appropriate to ask what impact the automatic processing of data has upon organizations

which exist more or less for the purpose of processing information.

We can conclude, as a result of ten years' experience, that automatic data processing is having a profound effect on the type of work performed, on the type of jobs that are being created, and on the structure of organizations. Let us consider the questions of methods, training, and organization as they are affected by data-processing equipment.

METHODS

There are hundreds of data-processing systems installed, and of those hundreds there have been only four or five system failures. We can conclude that the basic machinery and the basic art are right, judging by the few systems that have failed.

We might ask, is it possible to continue the growth of the data-processing art by the constant creation of new equipment? Probably it is impractical to continue to impose new equipment into present systems without major improvements in data-processing methods. Consider the most advanced data-processing methods that have been available to us since 1945, when the first principle upon which the computers are based was enunciated. Since that time, there have been few major developments in the logic or the systems organization of these machines. Most of the creative developments in this time period concern themselves with machine components; the development of high-speed magnetic cores, the development of magnetic tape, and the development of character sensing. On the other hand, the systems ideas, around which these components are organized, are a relatively small number. Looking into the near future, it appears unlikely that dramatic system break-throughs will occur in developing a new way of organizing components to do work. Because of this, it is increasingly important that the people who are doing the planning of methods and systems take the lead in the organization of the components and machines that can now be produced.

Consider how methods can influence the development of new components. Large data-processing systems, such as are used in government and industry, require programing to translate the job to be done by the accountant into machine language. At present, the language of machinery is very simple and primitive.

Some advances have been made to bring the level of the machines closer to the individual. This means, theoretically, people will have less to learn about machines in order to use them. However, automatic programing is not a panacea. Programing is a tool which makes the machines usable, but it has to be understood at some depth by methods people in order to utilize the machines properly. The machine equipment industry is seeking to develop languages which are compatible, with an eye to a possible future universal language. However, we are not at that stage today, and the methods man must recognize this fact in designing his procedures.

Actually, the methods man and the programmer have made significant contributions in the development of new ideas that are translatable into machine hardware. The methods man must consider not only the design of a system but the ability to diagnose trouble in the system and the ability to enable the people servicing equipment to determine quickly the areas of malfunction.

We are dealing with extremely complicated systems, even though they may be housed in small boxes. It is more important than ever that accounting controls and procedures be included to guarantee such diagnosis. This is a talent that a machine expert does not necessarily possess. Generally speaking, his set of talents does not lend itself to implementing the concept of methods controls and procedures. He is more concerned with the microcosmic handling of data once it is in the machine.

The next point of challenge and responsibility is in the documentation of methods. As the system becomes increasingly integrated and faster, we cannot allow methods to be evolved gradually on the machines as they are in practice. Consider a machine that has been installed for one year on which the procedure has been continuously patched. At the end of the year it is almost impossible to tell what the machine system is doing at any given time. Hence, for the purpose of integrity of the procedure it is necessary to move to a higher level of documentation. Furthermore, when considering the replacement of equipment to take advantage of the technological changes that are inevitable in our industry, we must plan ahead by having appropriately documented procedures so that certain components of the system can be replaced without rewriting the whole program.

The actual design of methods for a data-processing system is going to require a new level of method supervision. It is no longer possible, as in some punch card installations, to assign the work as you go, that is, to have kind of a broad plan in your mind, with sketchy flow charts, and then assign machine parts to people. You now have to think the total job through, determine what parts are interrelated, what parts can be separated, and then assign those to teams, making certain that the output of the individual teams will fit into the whole system. There is nothing mysterious in this; it is just simply a new level of sophistication in an old field.

The integration of applications into a data-processing system can only be done by people who know the applications and who are responsible for them, not by the machine experts. So again the methods men face a challenge to broaden their sights in order to be able to integrate what the machine industry can provide.

TRAINING

How do we recruit people for these jobs? Do we need people who are engineers, mathematicians, or physicists to do this work? During the past five years, it has often been implied that, if a person did not have a degree in mathematics or physics, he was not qualified. This notion prevailed because of the glamour of electronics and the high speed of the computing engine. Proof exists today in industry and government installations, that with adequate training present methods staffs can completely handle the most advanced system. Further, it has been proven that college graduates and high-school graduates of sufficient alertness can produce effective machine programing work within three months of initial training. We can debunk the idea that we need people professionally trained in engineering to operate and program the machines.

Past experience tells us that the key to a successful operation is the supervisor. A good supervisor should have the ability to understand the differences in principles between, for example, punch card tape processing and the random access equipment. He should have the managerial quality of trusting the people who are working with him and to delegate properly. He should have basically an inquisitive nature to search for new ideas and new

procedures. This type of man can organize work to be put on machinery, can divide that work into parts and give it to people he trusts, and then can take the result of their efforts and integrate it into a completely automatic and well-controlled system. If you have a good supervisor in an installation, your personnel problems are minimized, because he will bring in and develop the right kind of people.

During the last five years, much has been learned in organizing and developing new methods teams. Aptitude tests are available to assist in the selection of operators, programmers, and methods personnel. It is possible to start with a pool of inexperienced personnel with average ability or better, give them quality training in the application, programing, and operation of the machine, including actual experience in debugging their programs, and at the end of a year have a competent staff. In a discussion of personnel training, it is appropriate to mention that many new job opportunities are created. Industrial and government experience supports the fact that, where the newer equipment has been installed, people have been upgraded rather than displaced.

A recent article in *Nations Business* reported that in new data-processing installations people were being paid more and were doing more interesting work.[1] The cost of all of this was supported by the fact that the present work loads could not be adequately handled on the previous system. The displacement of people has been a much overestimated problem. The basic problem is the initial selection of the right people who can grow and be upgraded in their jobs to give a more effective personal performance.

We may conclude that training is really not a difficult problem if you have the right supervisor. The burden of responsibility for the selection of competent supervision and the development of adequate training programs rests on the shoulders of management executives. In order for them to discharge their duties properly, they should begin learning more about the practicalities and principles of data-processing equipment in order that they can lead others.

[1]Philip Gustafson, "What Management is Learning from Computers," *Nations Business*, XLVI (Nov. 1958), 38 ff.

ORGANIZATION

A final point of discussion is the impact of data-processing systems on the organization of departments. Departments are organized the way they are because responsibilities have to be split. Individual responsibilities and authorities are necessarily limited, resulting in the pyramid type of organization, where departments other than those directly involved in line operations are dealing with information.

Realizing that organization theory has developed as it has because of the limitations in the ability of individuals to ingest and digest data, it becomes necessary to rethink how our new techniques may be used to enable enormous ingestion and digestion of data. It is inevitable that in the next twenty-five years our concepts of organization and management are going to change. The concept of accounting and comptrollership will be expanded. It will operate as a larger function in business and government. The top management level of a business, using centers of intelligence, will determine company policy, with one group of people to discharge and implement, and another group of people to control and measure it. This gradual functionalization of business with the intelligence or information-handling group in one compartment is already beginning to develop.

It becomes increasingly evident that top executives in both business and government must begin to think in terms of the purpose of their organization as well as its structure. The reasons for the creation of departments and functions are changing under the impact of automatic information handling. It becomes increasingly important that top management organize to better the functioning of the organization, rather than to facilitate information processing and lower-level decision implementation.

It will also mean that managers will have to think of the impact of such changes on the management between the policy-making and the operating levels in business. It is inevitable that the data-handling and data-processing functions of this management group will undergo a very real change. Specifically, when an organization begins the use of data-processing equipment, consideration generally starts in one functional area or one operating area of the

business. Then it expands, and, where one department was involved, several departments are now involved. It becomes generally the duty of the policy-making level to make certain that such equipment will be considered for the good of the total organization and that the use of such equipment be allowed to cross department lines. There must be some way in which departments subject to elimination can raise objection, and there must be some way to adjudicate differences. This kind of management planning for machines, involving the human rather than the systems resources, is something which has been often lacking in business. The displacement of people is a diminishing problem, which is being taken up by sheer growth, whether it is in government or industry. On the other hand, the policy direction of an organization as it makes itself automatic is one of profound significance. Managers must understand the nature of the machines to be in a position to exercise the necessary policy guidance.

Another point of responsibility for management is consideration of possible future automatic data-processing methods. For example, will your organization be in a position to take advantage of opportunities in the use of automatic, random access memory files? Assume that the technical problems of retrieval from the file, audit and control of the file, and input to the file can be solved. Assume that you do actually have enormous memory files. How would you integrate these into your methods? Suppose they were available next year. Could you use them? Suppose they were available in the next five years. Could you use them? Enough has already been published about memory research, so managers should be thinking about how this will affect procedures.

Consider the question of high-density data transmission between widely separated points. Today we are essentially limited by the audio spectrum on the telephone lines, but it is inevitable that the communication industry will learn to transmit masses of data. How would this affect the accounting procedures of a government agency?

Consider the use of film in record keeping and accounting. To date it has been nothing but a media for storage of occasionally retrieved information. Have we really exhausted the possibility? Coupling film with other technology, how would you use it? What

would you idealize as the ultimate system? It is possible that in the not too distant future you will be able to store information on film and retrieve it automatically. What does this mean in typical accounting practices?

Consider the paper handling. Today many companies are conducting research in equipment for processing paper documents. What will be the impact of standards of paper handling comparable to the standards of punch card handling? What would this mean in terms of government and business operations?

Consider character sensing, the ability to read stylized type. Again the industry is just beginning to move into this technology. It appears inevitable that it is going to be practical and feasible economically to use the automatic sensing of documents by machines. If these documents were created by machines, the question immediately arises, are we creating the right kind of document out of today's machines. Are reams and reams of paper necessary?

Finally, consider the question of the whole area of information retrieval, the storage of visual information. How would this be used in methods work? What would you do if you had an automatic way of getting at large memory files, if you didn't have to use magnetic tape?

All these developments that have been described are actually working and being worked upon in the laboratories today. It is obvious that the managers of accounting and control functions in business and government must bring themselves to a level of sophistication where they are not overwrought by the fact that there are tubes, diodes, and transistors involved. Rather, they must appreciate the fact that it is going to take a great deal of their ingenuity and ability to use the fruits of this technology.

The question of integrated data processing, as it is normally thought of, is a methods problem rather than a hardware problem. Five or six years ago integrated data processing was thought to be anything that involved paper tape. Today the definition sometimes seems broad enough to cover any computer application. However, there are two basic facets to the integration of data processing. One involves the communication of various parts of a large system, whether it is by transmission wires, magnetic tape,

or punch cards. This could be called the hardware aspect of integrated data processing. The other is the integration of applications or the integration of uses of machines. The whole structure of information handling in an organization should be viewed as a series of integrated steps, where, for example, the output of one application may be parallel input to a second. This second viewpoint is the more difficult viewpoint to think and talk about, but it is the heart of the accountant's and method man's future.

The technology of transmitting information, of processing it and storing it, will be developed by the equipment industry. The technique of using this so that the accounting and comptrollership function rises to the level that it has to in the future of our organizations is the real challenge.

Clifford J. Brinkman

Management Engineering and the Comptroller

What is the relationship of management engineering and accounting? Management engineering assists management in solving problems of broad planning and detailed problems of increasing efficiency at all levels of operations. Is the management engineer hampered in carrying out his responsibilities if he is placed under the comptroller? Top management must weigh the value of having an independent group against the danger of having practical as well as impractical recommendations suppressed.

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"SHOULD management engineering be a function of the comptroller?" This is a question which is raised frequently. The answer to it depends to a large extent on the nature of the enterprise within which the comptroller performs, his role in the organization, the scope of the management engineering activity, and the experiences and beliefs of top management. Thus, the task of providing a definitive answer to the question is difficult without extolling the virtues of an independent management engineering staff or, contrariwise, the merits of assigning management engineering to the comptroller.

CAPTIVE MANAGEMENT CONSULTANTS

In the area of semantics the answer to the question becomes confused, for we find terms like planning, administrative management, management engineering, methods and systems, procedures and methods, management analysis, organization and methods, management assistance, industrial engineering, and the like being used rather loosely and interchangeably. The need to augment the time of executives by special staff units has generally been recognized in government, business, and industry. Most large organizations are dotted with planning and procedures staffs, analytical groups, and the like, which provide specialized assistance to their busy bosses. Such staff organizations have provided valuable assistance in their specialized areas and will continue to do so, but, because their first concern usually has been current operations, the tendency has been to become absorbed with the immediate daily needs of the separate elements they serve. Often their utility with respect to the future needs of the whole entity is somewhat limited. Gradually, executives at the top of the pyramid in business and industry have come to realize that they are not getting the kind of assistance they are entitled to in solving complex problems. Initially, they drew their assistance in developing better organizations, administrative systems, and so forth from outside management consultants, who could devote full time to studying, researching, and obtaining solutions to matters which had worried top managements overburdened with the intricacies of day-to-day operations. Ultimately executives in business, industry, and government came to recognize the need for a staff of what might be called *captive management consultants,* who would report to the principal executive and who would be completely free of daily operating pressures. Thus they could devote full time to the broad-gauge planning, studying, researching, interpreting and analyzing so essential to obtaining answers to problems and to maintaining and strengthening the position of the various enterprises in their respective theaters of activity. Hence, appearing under a variety of titles and employing a variety of methods, management engineering can be defined very simply as that function which helps management find and install better ways of getting the job done. It employs a variety

of principles, tools, and techniques (some scientific and some not so scientific) in seeking the answers to management problems.

Just how successful such organizations have been in serving management and in keeping abreast of the newer and sharper tools and disciplines for accomplishing a difficult job is hard to say. Too often management engineering staffs have not possessed either the varied skills which successful performance of the function demands or the imagination to apply these skills profitably to management's most pressing problems. In consequence, the staff may be engaged in worrying about the details of forms control or some minor administrative issue and neglect forward planning. With today's complex problems and the sophisticated methods being used to obtain optimum solutions, progressive staffs are equipping themselves with the techniques of operations research, knowledge of high-speed electronic computers, and the like so that they might, for example, help management "game" an important decision or solve a difficult inventory, production, or distribution problem.

THE TASKS OF MANAGEMENT ENGINEERING STAFFS

While the ways in which management engineering staffs operate will vary with the organization, we can discuss in a general way the kinds of things they do to help management and the manner in which they conduct these activities. The staffs make, among other things, studies and surveys of the operations of the business, using a variety of skills, techniques, and tools to provide a basis for top management planning and policy making. Another major sphere of activity is planning the organizational structure, where many difficulties may be encountered. Each department head is usually motivated by objectives related to his own responsibilities. In solving separate departmental problems without specialized help, compromises are generally produced which give something to everyone but fail to produce an over-all satisfactory result for the enterprise as a whole. It is possible through systems simulation to experiment with organizational structures without the upsetting experience of physically shuffling and reshuffling people and things in the real world. We know if a real life test succeeds as a result of a certain amount of detailed study all is well and good, but if it does not succeed people

become unhappy, production suffers, and a great deal of "cut, make, and trim" must be resorted to under generally unsatisfactory conditions before attendant confusion and high costs are overcome. In systems simulation such shortcomings can be minimized, and the testing and experimentation with organizational change is facilitated off-site in much the same way as an experiment in a research laboratory.

Another major area of activity is the design and installation of complete systems involving procedures, methods, and so forth. In the fast-moving era in which we live new approaches to difficult systems problems are being sought, and new procedures and controls are being introduced to gain the benefits of reduced costs and improved handling.

One of the more important responsibilities of the management engineering staff is to render assistance to top management by attempting to resolve various viewpoints in an organization through obtaining and analyzing all the facts on a problem and by presenting for consideration as objective and impartial a solution as possible.

Many staffs perform the function of reports and forms control. Unfortunately, the performance of these control functions, while important in itself, may divert the management engineering staff from its broader-gauge planning and analyzing. Consequently, such responsibilities have often been assigned to central administrative units which provide office services such as central mailing and filing, allotment of office space, and the like. This, too, may have unfortunate consequences, since such arrangements have resulted in "rubber stamp" reviews which of course have hampered the design of effective reporting systems. In the federal government it is not uncommon for the reports control function to be assigned to a statistical organization, which may or may not be part of the comptrollership. The thinking of course behind this arrangement is that the control of reports facilitates the statistician's responsibility for the design, operation, and control of information-gathering and reporting systems.

The requirement for better information is growing as our economy becomes more complex. The various existing arrangements for managing reports should be modified to ensure that the infor-

mation people insist they need, more or less on an intuitive basis, is in fact optimal data. In the past we have relied on analysis and test. Analysis is appropriate where it can be applied, but its weakness lies in the varying human capacities for judging imponderables. An analyst unaided by mathematical techniques finds it impossible to deal forthrightly with the variables in some situations. Testing or experimenting in real life has limitations as well as being inevitably more costly. Certainly benefits would be derived from extending systems simulation to large-scale reporting problems, although it is not always feasible to duplicate all conditions.

Some staffs also perform the functions of work measurement and manpower control. In industry work measurement is usually assigned to the industrial engineer responsible to the executive in charge of production. This is because of the early, continuing, improved, and refined use of time and motion study techniques by industrial engineers in industry. In the federal government the use of timing techniques of any kind for measuring the work of individuals was proscribed for years. As a result, government agencies used statistical work measurement based on average performance with little or no emphasis on the "one best way" to perform thousands of different operations, many of which were of an industrial character and lots more of an office type. In recent years the restrictions on the use of the stop watch and other techniques for timing operations were raised by the Congress, and some government agencies have taken steps to apply the industrial engineering techniques of time and motion studies to the development of engineered performance standards. The function is now generally associated with management engineering staffs regardless of whether they are identified as independent staffs reporting to top management or are a part of a comptrollership, although in agencies with a greater industrial base it has been identified as industrial engineering and assigned to the official responsible for production.

METHOD OF OPERATION

In performing their responsibilities successful staffs stimulate and ensure the development of management planning, highlighting potential weak spots and problem areas that busy executives are

liable to overlook. They are careful to avoid creating resentment on the part of the functional specialists who are responsible for the various operations of the enterprise. They explain why change and improvement are necessary and enlist operator participation. Since they "have no axe to grind," they scrupulously avoid any implication of police action, relying on their experience, specialized knowledge, and grasp of the situation to "sell" their viewpoints rather than enforce them. This is not always easy to do. Effecting change is very often difficult, especially when a person's prestige appears to be involved. He who is about to be reorganized wants to know, and quite understandably, "What's in this for me?" Usually it has to be something more than a change in the title on the door. I once heard the remark that "the best way to accomplish a change in organization is to provide a comparable or better position in the hierarchy for the principal executives involved, who, having had their positions clarified, would effectively sell the changes to their subordinates for you."

The onus is squarely on the management engineering staff to come up with solutions which are easily recognized as constructive, necessary, to-the-point, and appropriate to the situation. It also suggests that the staff should steer a wide course around the sea of controversy which involves change for the sake of change.

As has been suggested, the range of activity can be either narrow or broad. For example, a staff might be narrowly and busily concerned with compiling and maintaining the organization manual for a company rather than endeavoring to study and research what organization changes should be planned for in the light of economic developments, changes in mission, and the like one year or five years hence. Then, too, such a staff might be engaged in conducting a fairly simple straightforward review of procedures and other administrative issuances prepared by the operating divisions when it might be devoting its energies to employing a considerable number of diverse and sophisticated disciplines to design and install integrated systems, controls, and routines for the entire enterprise. In order to provide the kind of service to which top management is entitled, management engineering staffs have got to draw on specialized knowledge and skills in many fields including the sciences, mathematics, and the principles of engi-

neering analysis and design. This does not mean that many long- and short-range problems cannot be solved now and in the future by more pedestrian methods. Difficulties in constructing mathematical models abound, thus limiting effective use in circumstances where current developments do not permit dealing with all the facts at the same time.

MANAGEMENT ENGINEERING AND THE COMPTROLLER

How then does this function fit into the comptroller concept? In many businesses the comptroller is the principal accounting official; the largest part of his responsibilities are with respect to general accounting, cost accounting, budgeting, accounting systems, and related areas. In some organizations his work has been expanded to cover other functions such as internal auditing, statistical reporting, and analysis of the results of operations. And in still others it has included work measurement and quality control as well as organization planning and control.

The rationale for the growth of assigning to the comptroller methods and systems work which goes beyond accounting requirements is easily understood, particularly in enterprises where operations are largely financial in character. Banking and insurance companies have for a long time looked to the comptroller for the development of internal office procedures and methods which do not belong specifically to accounting. The reasons are quite obvious when one considers that effective accounting operations in large organizations require the development of complex records systems and subsystems. Since the operation of such systems occupies a large proportion of the clerical help available within the enterprise, it is no wonder that the comptroller has had to resort to such techniques as work simplification, work measurement, and records management, including creation, retention, and disposition of records as well as forms and reports in order to maintain his own costs at a minimum in the face of increasing volume of work and scarcity of capable clerical help. Consequently, once he has perfected these tools for use within his own area of responsibility, it is only a small and seemingly logical step to extend his help and assistance to the personnel director, the manager of the banking

floor, the trust department, and others, to improve their operations and perhaps in the process even to strengthen the systems of internal control and internal check.

The logic of extending such help becomes less meaningful when the enterprise has large manufacturing and production operations, a large selling force, and engineering and research facilities and is diversified across many fields which involve scientific, engineering, and other professional skills not commonly found in the training and experience of the comptroller and his organization. Currently we find, for example, that many comptrollers have expanded their interests to include the exploitation of the potentials of high-speed electronic computers. This interest is the natural outgrowth of their prior experience in the mechanization of accounting systems.

It is in the area of internal auditing that overlap appears to be rather commonplace as between an independent management engineering function on one hand and the comptroller on the other. This of course is understandable since the auditor and the management engineer daily come face to face with a vast and growing complex of clerical procedures, practices, and methods. The internal auditor performs a useful and constructive service for management. However, the very nature of his responsibilities would tend to inhibit "blue sky" thinking. More to the point, there is considerable divergence of view as to how much he should participate in the prior development of new policies and procedures. In the environment of some organizations the internal auditor is providing the only measure of a management consulting service available to top management when he is required to comment on the plan of organization, methods, reports, productivity, and the like and to submit recommendations for improvement or correction.

There are probably as many variations in the content of the comptroller's job as there are comptrollers, since differences in philosophy, experience, interests and the preferences of individuals as well as the needs of the various enterprises must be taken into account.

Obviously problems can and do arise from the assignment of mixed responsibilities and disciplines to one individual. Budgeting is a planning technique which is forward looking. Accounting, on

the other hand, both general and cost, and auditing are concerned with current and past transactions of the business. If the comptroller permits himself to be absorbed with accounting and auditing, it is possible that he will be diverted from the development and management of a broad-gauge, forward-looking, budget-planning function. A budget which is merely a projection of the past is not a very sharp tool for dealing with the future. Yet, it is not uncommon for the character of the comptroller to be fixed by the educational background, training, and experience of the individual executive assigned the responsibilities of the function. Further, each activity to be properly performed requires different applications of talent, knowledge, and skills despite the similarity of terms used in accounting, auditing, and budgeting. Where freedom to apply the various skills to the utmost is missing, the logic of merging these varied responsibilities tends to become obscure. In the federal government, where budgeting is perhaps as important and as substantive a program as any agency has to carry out, a comptroller could spend virtually all his time planning, co-ordinating, and controlling the budget.

CONCLUSIONS

All of us can agree that management's problems are becoming increasingly complex. Management seeks aid from those who are not saddled with administrative detail and day-to-day responsibilities for supervision. As the supervisor of a variety of important activities which are carried out for a common purpose, the comptroller is open to the criticism from other department heads of not being objective, particularly where his own organization is concerned. On the other hand, management staffs have been justifiably criticized for being impractical and without the capacity for implementing the very recommendations they seek to convince department executives are necessary. But there is also the possibility that the comptroller, with his eye to the year-end profit-and-loss statement, may unwittingly put a damper on the "off-the-top-of-the-head" research into systems design which employs some of the newer, unfamiliar management techniques. The disciplines of mathematics and engineering are not familiar tools to most comptrollers. Yet these disciplines are fundamental in developing solu-

tions to administrative problems which cut across the interrelated activities of an enterprise.

Obviously, each management group must decide for itself where within the organization it will place the analytical tools that aid it in getting its job done. The objectives of each element in an organization are not always compatible or consistent and frequently are in opposition to each other. The value of having a group free from dependence on, or loyalty to, any one functional element in the business cannot be overlooked. Management engineering, as an independent aid to top management, can be the catalyst which provides the means for solving in "the one best way" problems involving the diverse interests and objectives of all the elements of an enterprise to produce a harmonious over-all balancing of objectives. Finally, regardless of where the function is placed, it needs these things to succeed:

a) The support and confidence of top management.

b) A competent and imaginative staff with as wide a range of experience and capacity in the various applicable disciplines as it is feasible for the organization to support.

c) A desire on the part of the staff to find the "one best way" in a timely and responsive fashion so as to continue to merit the support of top management and achieve acceptance by lower-level officials and their staffs.

Robert F. Brandt

The Japanese CPA

The public accounting profession in Japan is of recent birth but is making rapid progress in establishing itself as one of the recognized professions. This paper is a summary of an address before the Tokyo Chapter of the Federal Government Accountants Association by a distinguished member of the profession, Mr. S. Fushita, Associate Partner, Lowe, Bingham & Thomsons, Tokyo. The summary was prepared by Robert F. Brandt, Vice President of the Tokyo Chapter.

Mr. Brandt is Director, Far East Branch, United States General Accounting Office, Tokyo, Japan.

THE Japanese Certified Public Accountant has only recently attained professional recognition in a country world-renowned for its commerce and industry. The Federal Government Accountants Association of Tokyo at its May 1958 meeting invited Mr. S. Fushita, a well-known Japanese CPA, to tell its members something of the background, requirements, and work of the profession in Japan.

Mr. Fushita is well qualified to discuss the subject. He is an associate partner of Lowe, Bingham & Thomsons, correspondents for Price Waterhouse & Co., and holds Japanese CPA Certificate No. 259 issued in 1950. Mr. Fushita graduated from the Tokyo University of Commerce, which is considered to be the leading school of business in Japan. During the war he served his country as a captain in the Finance Corps. Subsequently, he was an accountant for Mitsubishi Electric Manufacturing Co., Ltd., and in 1950 he opened his own firm in Tokyo. This summer Mr. Fushita plans

to visit the United States for the first time and will observe and study public accounting standards, policies, and practices, as well as industrial operations in various cities in America.

Mr. Fushita brought out many interesting facts about the brief history of the Japanese CPA profession. The auditing function in Japan did not evolve from recognition of its need and usefulness, but rather was given a sudden birth by government edict shortly after the end of World War II. It was not until 1957 that the requirements of the Japanese Securities and Exchanges Commission included compliance by CPA's with the full scope of auditing standards as known in the United States. It is also of interest to note that all labor unions by law are required to obtain an accountant's opinion on their financial statements, which are published (usually by display) to their membership.

The CPA license is issued by the Japanese Government, specifically the Ministry of Finance. This Ministry appoints a committee of prominent practicing accountants, educational leaders, and businessmen to administer the examination. The examination itself is in three parts, usually referred to as the preliminary, the intermediate, and the final. The preliminary examination is waived to persons holding a university degree. The preliminary is generally considered extremely difficult and in practice is avoided; applicants consider it easier to get a university degree than to be successful in this examination. The examination takes one day and consists of mathematics, social science, and the Japanese language.

After passing the preliminary, candidates are immediately eligible to take the intermediate. This examination is of a technical nature and covers general and cost accounting, accounting theory, auditing theory and practice, commercial law, economic theory and practice, and management theory and practice.

Upon successfully passing the intermediate examination, the candidate must enter upon a three-year apprenticeship with a practicing CPA, which may be reduced to two years if the applicant successfully completes one additional year at an accredited accounting school.

Recently it has become difficult to secure an appointment as an apprentice because the demand for the services of qualified accountants in Japan is still limited. This apprenticeship is closely

supervised by the Ministry of Finance through reports made every three months by the apprentice and signed by his principal. The report contains a brief description of the work done and the names of the clients for whom it was done. During this period the candidate may register as an "Assistant CPA" and perform all usual accounting functions except that he may not accept audit engagements on his own.

Finally, upon the completion of the apprenticeship, the final examination is taken. This consists of accounting and auditing principles and practices as well as taxation and management theory and practice.

The percentage of candidates who pass each of the examinations is evidence of their difficulty. In 1957 only 49 out of 751 candidates passed the preliminary examination; 187 out of 2,608 who took the intermediate passed; and in the final, in the same year, 125 were successful out of 1,047 candidates. In April 1958 there were 1,514 CPA's in Japan, of whom 1,340 were registered as practicing. There is also a group of accountants known as Registered Public Accountants, of which there were 3,465 in April 1958. There are no further admissions to this group, so eventually it will become extinct.

Under the Japanese Securities and Exchanges Law, corporations having outstanding capital of 100 million yen (about $280,000) and whose shares are traded on the stock exchange are required to file a report with the Ministry of Finance within three months after the close of each accounting period. Most Japanese companies use an accounting period of six months. The report is required to contain, among other things, a balance sheet, a profit and loss statement, a statement of earned surplus, and the CPA's opinion on the foregoing statements. At present, there are only about a thousand companies which are required to report in this manner. Exceptions are made in the case of banks, insurance companies, and similar institutions.

The fees obtained for auditing are relatively low, and audit work comprises a small proportion of the practice of most CPA's. The principal activities involve posting the books of small businesses and rendering tax advice. A reasonably successful CPA may normally expect to earn the equivalent of about $10,000 annually, which after taxes and expenses nets to about $4,200. This is con-

siderably higher than the wages of other white-collar workers, even after including fringe benefits. Thus, the better students are attracted to the profession.

There is an association of CPA's with ten chapters throughout Japan. So far, twenty-five foreigners have qualified to practice as foreign CPA's in Japan, on the basis of accepting generally recognized qualifications. Some questions have been raised recently about the ability of the foreigners to read Japanese for the purpose of signing S.E.C. reports. On the other hand, it is argued that the presence of foreign CPA's, particularly American and British, will do much to help develop high standards for the profession in Japan.

In concluding his address Mr. Fushita made some brief observations on bookkeeping procedures and accounting practices commonly prevailing in Japan at the present time. The system most frequently encountered consists of a volume of journal slips which are summarized daily for posting to the general ledger; postings to subsidiary accounts are made from the individual journal slips. Supporting documents are usually filed separately from the journal slips in a manner which makes cross reference most difficult. The system leaves much to be desired, although some progress has been made in recent years, particularly in the larger companies, by providing separate listings of transactions of a similar nature. In cost accounting a foundation of basic technical data exists, but there are still not enough technically qualified accountants to incorporate this data into accounting processes meeting management needs. This is complicated also by the failure of many business leaders to recognize the critical need for better cost accounting in Japanese industry.

The profession has made great progress in the short time since its establishment. As it becomes more widely recognized in future years, it is expected that the profession will make major contributions to the improvement of accounting and management techniques in the Japanese industrial community.

Herschel C. Walling

Technical Accounting Developments

THE BUDGET FOR FISCAL 1960

THE President submitted the Budget for the fiscal year 1960 to the Congress on January 19, 1959. The Budget Message of the President contained several recommendations for improving control over the budget. The following passages are quoted from this section of the Budget Message:

Improve Control Over the Budget

Actions can and should be taken to achieve more effective control over the budget by improving present practices and procedures, especially those related to the consideration of budgetary requests.

Consider full fiscal situation: The procedure used by the Congress for the review of fiscal matters is one which only the Congress itself can determine. Nevertheless, I believe that achievement of any overall fiscal objective is handicapped by the absence of arrangements under which the Congress can look at the fiscal situation as a whole.... I sincerely hope that the Congress will again consider ways by which it can more effectively overcome the diffused consideration which results from separate appropriation bills, the provision of new obligational authority outside of the appropriation process, and the separate deliberations on revenue bills and the debt limit.

Item veto: The item veto is another important and needed reform, regardless of whether appropriations are made in a number of bills or in a consolidated bill....

Public enterprises: The appropriation and fund structure of the Government needs a new review and some overhaul.... Legislation will be proposed to permit these enterprises (Rural Electrification Administration, Farmers' Home Administration, and the power marketing agencies of the Department of the Interior) to be budgeted through revolving funds. The possibility of converting still more business-type activities to a revolving fund basis will continue to be studied, with a view to making recommendations to the Congress....

Legislation will also be proposed to incorporate the Alaska Railroad to facilitate its operations on a businesslike basis.

Accrued expenditures and other controls: In accordance with Hoover Commission recommendations, legislation was enacted last year to enable the Congress to exercise more direct control over the level of Government spending through limitations on accrued expenditures. As an initial step, this budget proposes such limitations for six appropriations. The beginning that can thus be made in improved congressional control should be extended as rapidly as experience warrants.

This budget extends the cost-based budgeting procedures which are necessary to get a proper measure of financial performance for many of the various agencies and programs. Further extensions will be made as agency accounting systems are made adequate to support them.

Continuing improvements: Efforts to improve financial management practices need to be continued. Considerable progress has already been made by the executive agencies under the leadership of the joint accounting program which is sponsored by the Bureau of the Budget, the Treasury Department, and the General Accounting Office. But there remain a number of unsatisfactory situations, unimportant in earlier years of smaller budgets, that are now worthy of attention.

In the past, a number of appropriation items have been placed on a permanent basis and, in some of these cases, the major result achieved has been weaker control over the expenditures concerned. In addition, even though there are a few justifiable exceptions, the practice of providing authorizations to expend from debt receipts and contract authority outside the appropriation process is generally inconsistent with sound standards for budget practice....

Another problem in budgetary control has developed over the use of foreign currencies.... The action required by the Congress to authorize the use of certain of these currencies, for which a supplemental request will be transmitted for fiscal 1960, now relates to only a small portion of the currencies which will actually be used for Government programs.

The Director of the Bureau of the Budget is undertaking studies of

the various weaknesses and inconsistencies mentioned herein to determine the most appropriate courses of action. Corrective recommendations will be made to the Congress as needed.

ACCOUNTING FOR LEASE-PURCHASE CONTRACTS

A statement of accounting principles and standards for real property acquired under lease-purchase contracts has been added to Title 2, "Accounting Principles and Standards and Internal Auditing Guidelines," of the *General Accounting Office Policy and Procedures Manual for Guidance of Federal Agencies* (Section 1284). (Title 2 of the *Manual* may be purchased from the Government Printing Office for $2.50, which includes subsequent additions and revisions of the title.)

Section 1284 states the principles and guidelines for determination of the costs to be capitalized and the liability to be recorded when lease-purchase buildings are completed and accepted. It provides:

> The total purchase price included in the lease-purchase contract should be capitalized as a fixed asset upon acceptance of the building from the contractor, rather than periodically as payments are made or when title vests in the Government.... Costs applicable to the property which are incurred by the agency prior to or during construction, and not included in the contract, should also be capitalized.... The total purchase price included in the lease-purchase contract should be recorded as a liability at the time the building is completed and accepted by the agency.

The annual payment for principal made under the contract is charged to the liability account. Whether to record depreciation on real property acquired under lease-purchase is determined on the basis of the same factors as for property acquired outright.

FOREIGN CURRENCY OPERATIONS

The foreign currency operations of the United States Government have in recent years shown a marked increase due to various new programs authorized by the Congress. Under Executive Orders 10488, September 23, 1953, and 10560, September 9, 1954, the Secretary of the Treasury was authorized to issue regulations governing the purchase, custody, transfer, and sale of such foreign currencies. The Secretary issued Department Circular No. 930, effective December 1, 1953, which has become the basis upon

which the foreign currency operations of the Treasury are carried on. Under this circular and its supplements, the Treasury compiles reports on the acquisition and disposition of all foreign currencies obtained without purchase with dollars. Foreign currencies are acquired in this manner in approximately seventy countries. There are approximately twenty-five programs that generate foreign currencies and twenty-three spending programs scattered throughout the various agencies of the government.

The Bureau of Accounts of the Treasury has recently prepared a manual covering these foreign currency operations. This manual includes the historical development and fiscal control of foreign currencies, the functions and procedures of disbursing officers and agencies carrying on the operations, foreign currency legislation and regulations, and the operating procedures of the section carrying on the central activities for the Treasury Department.

MANPOWER CONTROL SYSTEM

The Post Office Department has adopted a manpower control system, in terms of man-hours, for its larger post offices, terminals, and shops. Basic targets for the coming fiscal year for man-hours, work load, revenues, and expenses are developed by the regional officials based on estimates submitted by postmasters. Regional Operations Directors direct the granting and revision of quarterly man-hour allowances, which may not be exceeded without notification to, and proper authorization by, the Regional Operations Director. The Post Office Department has over 525,000 employees. The electronic data-processing equipment used in several of the regional offices provides information for use in the manpower control system.

INTERAGENCY TRAINING PROGRAMS

Under the Government Employees Training Act of 1958, federal departments and agencies are directed to provide training for their employees to assure that the work of the government is conducted in the most efficient and economical manner. Departments and agencies are also called upon by the act to make full use of training facilities available within the government before expending funds for training employees through nongovernmental facilities.

The Civil Service Commission, as part of its responsibility under the act, will conduct training programs for federal employees in those subject-matter areas for which it has primary responsibility. It will also encourage and co-ordinate the activities of federal agencies to provide other training on an interagency basis when combined effort appears to be warranted. In addition, the Commission will serve as a general clearinghouse of information on government training programs that are open to employees on an an interagency basis, so that agencies can be apprised of the availability of such training.

The Operations Improvement Division of the Commission issued a bulletin announcing several interagency training activities available during the spring and early summer, most of them in various areas of personnel management.

One of the programs announced, however, was an Electronic Data Processing Appreciation Program for Managers. It was designed to give managers in grade GS-13 or equivalent and above an elementary knowledge and appreciation of electronic data-processing equipment and its potential. Four sessions were scheduled to be held during April on two afternoons each week for two weeks.

Another program was a Management Institute for Leaders in Scientific and Professional Programs. This institute was designed to promote the effectiveness of scientific and professional employees in their present jobs by providing instruction in the techniques of administrative management and to promote their future effectiveness by study of important concepts and current issues relating to the organization and administration of scientific and professional effort in the federal government. It was an eight-day program scheduled to be held from May 25 to June 3 for professional employees in supervisory positions in basic or applied research or in professional services in the physical or life sciences.

COSTS OF EMPLOYEE TRAINING

Bureau of the Budget Circular No. A-48, "Regulations under the Government Employees Training Act governing (1) reductions in payments to employees and (2) absorption of costs of training programs," February 13, 1959, supersedes its Bulletin No. 59-4 of November 3, 1958.

The circular provides that the payment by an agency to an employee for expenses incident to training in a nongovernment facility, or travel, subsistence, or other expenses incident to attendance at a meeting shall be reduced to the extent of an approved payment by a donor for such expenses. No reduction is required, however, where an approved contribution or award to an employee covers types of expenses for which the agency is not authorized to pay, for example, subsistence expenses of the family of the employee en route.

Executive Order No. 10800 of January 15, 1959, and the regulations issued by the Civil Service Commission prescribe the conditions under which agencies may approve the acceptance by employees of contributions and awards.

The circular states that agencies will be expected to give a high priority to training programs in distributing available funds and other resources. Requests for increased appropriations will be considered only where the improvement in public service or other benefit will be so great as clearly to outweigh the lack of dollar savings to cover costs and where there are no requirements of lesser priority in the agency which can be set aside or deferred to provide funds for the training program.

PROPERTY INVENTORY REPORT

The House Committee on Government Operations has issued its fourth annual compilation of federal real and personal property assets. The report (committee print) is entitled "Federal Real and Personal Property Inventory Report (Civilian and Military) of the United States Government Covering Its Properties Located in Continental United States, in the Territories, and Overseas, as of June 30, 1958."

It shows total personal property at $195 billion and total real property at $67 billion, without deductions for allowances for losses and depreciation. The properties have been valued at acquisition cost or estimated cost when the actual costs were not known. Public domain is shown at estimated current values.

CASE STUDY ON AUDIT OF ELECTRONIC PAYROLL SYSTEM

The Auditor General, Headquarters, U.S. Air Force, has pre-

pared an "Audit Case Study of a Payroll Accounting System Utilizing an Electronic Data Processing Machine." The study was prepared as a training manual for Air Force auditors who are engaged in auditing systems which utilize electronic data-processing equipment. It is part of an over-all program to evaluate the audit implications of accounting systems utilizing electronic data-processing equipment and to make certain that audit requirements are fulfilled where use of such equipment necessitates changes in the applicable accounting systems. Copies are being made available to auditors in other agencies upon request.

WHOLE DOLLAR ACCOUNTING

The Bonneville Power Administration in the Department of the Interior has established a program for converting to whole dollar accounting for all items except transactions with the Treasury Department, vendors, customers, and employees.

CHART ROOM

The Veterans Administration has installed a chart room equipped with facilities for screen projection and wall panel charts. The purpose of the chart room is to augment the top management reporting system and facilitate monthly briefings of the Administrator and other officials.

CHECK PREPARATION

The Treasury Department has installed electronic check-writing machines in the Chicago, Philadelphia, and New York regional disbursing offices. These machines combine the check signing and microfilming of checks and simplify the preparation of check-issue lists and files maintenance.

COST-BASED BUDGETS

Only four appropriations were presented on the cost basis in the 1957 Budget. This number has increased progressively to the point where there were 129 appropriations presented on this basis in the 1960 Budget. Sample cost-type statements were submitted to the Bureau of the Budget for an additional 76 appropriation accounts. The 1960 Budget also included 121 business-type budget presentations for corporations and revolving funds.

H. Edward Breen

Current Publications

BOOKS AND PAMPHLETS

Anderson, Wayne F., Shelvy V. Langford, Ralph W. Muntz, Carl W. Robinson, and C. Raymond Wood. *Finance Department Organization.* (Special Bulletin 1958H.) Chicago: Municipal Finance Officers Association of the United States and Canada, Dec. 1958. 19 pp. $1.00.

"The increasing size and complexity of municipal government has resulted in equal complexities and volume within its financial functions. As a consequence an evolutionary development is occurring in finance department organization and in the requirements being established as prerequisites for finance department personnel. Searching questions and intensive studies are being made of finance department organization, relationship of that department to operating divisions, and of the entire question of professionalization of the finance department personnel, particularly the head of such a department.

"Various phases of finance department operation were discussed at the 52nd Annual MFOA Conference held at Milwaukee, Wisconsin. This bulletin is based upon five papers presented at that conference."

ARTICLES

Cadmus, Bradford. "A Quarter Century of Internal Auditing," *Internal Auditor,* 15 (Dec. 1958), 59–63.

The author presents a short historical review of internal auditing.

Carson, A. B. "Profile of a Profession," *Journal of Accountancy,* 107 (Jan. 1959), 50–56.

"The median income of California CPAs engaged in practice full time as individuals in 1956 was $10,357. For partners in CPA firms the median was $13,692.

"Between 1951 and 1956, the proportion of individual practitioners with gross fees over $30,000 a year increased more than 500%, while those with gross fees under $10,000 declined from about half to considerably less than one-third.

"These are among the highlights reported by Professor Carson from the most comprehensive survey of a large group of CPAs ever undertaken. Other findings include amount and sources of fees, average age, education, type of practice and professional and community activities."

Copeland, G. A. "Training and Developing Accounting and Analytical Personnel," *N.A.A. Bulletin,* 40 (Dec. 1958), 5–14.

"The controller's department's 'basic' and 'advanced' training programs—for new and higher ranking employees, respectively—and the company's executive development program are described in this article, with particularization of underlying procedures and forms used."

Daniel, D. Ronald. "EDPM—Getting Past the Barriers to Success," *The Controller,* 26 (Dec. 1958), 572, 573, 576–577, 592.

The author discusses the six barriers to successful EDP and shows how they can be hurdled or eliminated entirely.

Flanders, Dwight P. "Accounting and Economics: A Note with Special Reference to 'The Teaching of Social Accounting,'" *Accounting Review,* 34 (Jan. 1959), 68–73.

Mr. Flanders, Professor of Economics, University of Illinois, discusses and clarifies the distinction between accounting and social accounting, and accounting and economics.

Professor Flanders concludes "that accounting and economics are complementary rather than substitutable bodies of knowledge."

Gerhardt, L. Kermit. "Accounting and Auditing in the Federal Government," *Internal Auditor,* 15 (Sept. 1958), 29–41.

A striking advance has been made in the postwar years to modernize and improve the accounting and auditing practices of the United States Government. The author, an Assistant Director, Civil Accounting and Auditing Division of the General Accounting Office, describes

the recent history of developments, explains the underlying principles and achievements, and discusses the role of internal auditing.

Henion, Dorrance D. "Planned Management Control—An Application," *N.A.A. Bulletin,* 40 (Dec. 1958), 59–69.

The author presents a case study in the development of a plan for the administration of a company. The company embarked upon a formal program for control by appointing a "task force." An outline of the control program made available to the task force a means of evaluating the thoroughness with which the essential functions of the company were being treated. It showed whether or not each operation was being performed by the most suitable organizational unit, it presented an analysis of the duties and responsibilities of each segment of the organization, and it pointed out deficiencies in the reporting system that would weaken the exercise of control.

"The outline of the operations control program, as prepared through the combined efforts of the task force and the management consultant, clearly showed the functional and organizational areas that needed strengthening. Steps were then instituted to improve these situations and to weave a tight band of control around all of the company's operations."

Marien, Ray. "How to Control 'Report-itis,'" *The Controller,* 27 (Jan. 1959), 24–26.

The author presents a plan for reviewing the reports issued by any specific company and recommends that a segment of the controller's staff handle the survey or review. Report questionnaires are requested from both the originator and the recipient of the report. The author recommends that the company should: (1) set its goals; (2) standardize the formats, and (3) use "progressive" reporting techniques, constructed pyramid fashion so that the information is squeezed tighter and drier as it flows to the top.

Moffitt, Ralph C. "Procurement Auditing," *Internal Auditor,* 15 (Dec. 1958), 27–38.

The author discusses the general function of purchasing in terms of its recognition by management, its policies, objectives, responsibilities and authority, and the adoption of useful audit-type techniques in attaining objectives; standards of performances and evaluation as related to the field of purchasing; and the establishment of a proper

relationship between purchasing and internal auditing. The author concludes that the internal audit staff can render valuable assistance to purchasing through independent surveys and services.

Muns, Frank H. "Using IDP for Inventory Control," *The Controller*, 27 (Feb. 1959), 66–68.

Mr. Muns, Director of Office Methods and Procedures, Westinghouse Electric Corporation, describes the use of an integrated data-processing system installed for handling invoicing, shipping, and inventory control, which went into complete use in December 1958.

Oliver, Foster F. "Preparing for Random Access Equipment for Ordnance Inventory Control," *N.A.A. Bulletin*, 40 (Jan. 1959), 57–63.

"The considerations affecting choice between serial and random access features of electronic equipment, rather than particulars of application, are dealt with in this paper which goes on to describe the planning which followed the decision between these alternatives."

Sonderegger, Emory O. "Qualifications for Accounting Students to Meet the Needs of Business Firms," *Accounting Review*, 34 (Jan. 1959), 112–123.

The author presents a study prepared from a survey of 450 businesses or agencies which analyzes what businessmen desire in an accountant who has just received his college degree. Information was gathered as to character traits, time to be spent in college, grades received while in college, specialization within the accounting area, general education courses, general business courses, and accounting courses to be offered.

The objective of the project was to provide a greater understanding by would-be accountants of the requirements of business through direct replies to a questionnaire.

Spacek, Leonard. "Can We Define Generally Accepted Accounting Principles?" *Journal of Accountancy*, 106 (Dec. 1958), 40–47.

"In a provocative challenge to the accounting profession, Mr. Spacek contends that accounting principles can and should be defined to provide substantial comparability between the financial statements of different corporations.

"As examples of areas in which he thinks differing accounting treatments should not be permitted, he cites tax allocation, long-term lease obligations, and capitalizing certain items or charging them to expense.

He also argues that the effects of inflation should be reflected in depreciation charges.

"This is the latest of a number of speeches on accounting principles by Mr. Spacek which have attracted wide attention and comment."

Stewart, Charles A. "The Nature and Prevention of Fraud," *Journal of Accountancy,* 107 (Feb. 1958), 41–46.

"What types of employees are likely to become embezzlers?

"What are the responsibilities of management and independent auditors for the prevention of fraud?

"From police records, and from a special study of the confidential files of his own firm, the author concludes that there is no typical embezzler.

"Management has the basic responsibility for safeguarding the assets of a business against fraud as well as other hazards. The auditor must evaluate the system of internal control, recommend changes where needed, and should be alert to indications of possible fraud in the conduct of his audit."

Taggart, Herbert F. "Cost Justification: The Rules of the Game," *Journal of Accountancy,* 106 (Dec. 1958), 52–60.

"Only a handful of cases decided under the cost justification provisions of the Robinson-Patman Act have been made a matter of public record. None of the cases is necessarily accepted by the Federal Trade Commission or its accounting staff as a precedent. After discussing the difficulties and uncertainties of a cost justification defense, Dr. Taggart outlines eight principles and practices which are likely to be acceptable or probably unacceptable. He recommends that all studies to be used in such cases should be 'couched in accountants' language, based on the use of accountants' techniques.' It is also indicated that companies which sell at differential prices would be wise to consider the cost aspects in advance of any complaint from the Federal Trade Commission."

Teitelbaum, Louis N. and Milton A. Schwartz. "Practical Improvements in Audit Testing," *Internal Auditor,* 16 (Sept. 1958), 7–19.

Statistical sampling is receiving increased attention from auditors. In this article various methods of sampling are discussed and appraised. Of particular interest is the case study of statistical sampling techniques employed by the Air Force in auditing the shipping functions at depots.

Todt, Hans C. "The Controller Looks at the Purchasing Department," *The Controller,* 26 (Dec. 1958), 584–587.

In recent years the area of procurement has come to be recognized as an important function of any enterprise. "Purchasing usually has been considered a service function, a place where money was spent, not made. Recent developments have shaken this point of view. It is beginning to be replaced by a realization that good purchasing is essential to good profits; that the difference between good purchasing and poor purchasing can be the difference between excellent results and poor performance. The author believes that purchasing can be a profit-making activity when the controller and purchasing agent establish a line of communication supported by mutual cooperation."

Yu, S. C. "National Position Statement: A Proposal on Operational Principles and Process," *Accounting Review,* 34 (Jan. 1959), 74–83.

The author discusses the national position statement and explains the function of the consolidated national position statement worksheet. The author states that "this paper may be viewed as a general framework for the preparation of a national balance sheet." The emphasis has been placed upon the balance sheet items and problems of valuation.